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DIVISION 2 EARTHWORK

SECTION 200 CLEARING AND GRUBBING

200-1 DESCRIPTION

Clearing and Grubbing is the cutting and disposal of all vegetation within limits established by the Engineer in accordance with the method required by the Special Provisions and Standard Drawings.

Material high in organic matter such as root mat and other vegetative matter shall be removed as a part of Clearing and Grubbing. This does not include grass and minor cover crops, which is part of unclassified excavation. Removing grass and annual growth in preparation for embankments which are less than 6' in height is not considered undercut, but is incidental to the work of embankment formation per Article 235-3.

The following items are considered part of clearing and grubbing operations:

1. The removal of foundations, debris, etc. that are left as a result of the work required by Articles 210 and 215 of the Standard Specifications.
2. Filling of depressions or removal of humps in the natural ground surface in areas where mowing will later be required or to eliminate water pockets.
3. Preserving and storing any stream restoration features (root wads).

Compensation for the clearing and grubbing of borrow and material sources will **only** be made when these sources are furnished by the Department.

The control of soil erosion is an essential consideration in the performance of the work of clearing and grubbing. The Specifications require the contractor to “perform all work under this section in a manner that will cause a minimum of soil erosion and will meet the requirements of Article 107-13.” The Specifications also provide a limitation of 17 acres of exposed erodible surface area. The Engineer is given the authority to modify this limitation based upon consideration of conditions existing on the project. The Engineer should consider the following:

1. Has siltation been effectively controlled on previously grubbed areas?
2. Is the terrain, in the area under consideration, highly or moderately erodible?
3. Has the Contractor shown interest in the control of erosion and been cooperative in the installation of erosion control measures when instructed to do so?
4. Is the increase in area for the convenience of the Contractor or for the convenience of the Department? If for the Contractor’s convenience, the Contractor should be willing to perform temporary seeding and mulching, at his own expense. If for the convenience of the Department, is the availability of the area in question critical and is any increase in the cost of the required erosion control measures accordingly justifiable? An example of clearing and grubbing for the convenience of the Contractor would be to avoid move-ins of the clearing and grubbing personnel and equipment.
5. Does the area have high-quality water?

6. Can the Contractor meet the 21 day seeding requirement if additional area is grubbed?
7. Does the contract prohibit increasing the 17 acre limitation?

The Engineer should consult with the Division Engineer, the Roadway Construction Engineer, and the Roadside Environmental Field Operations Engineer for opinions and advice prior to exceeding the 17-acre limitation given in the Specifications. All considerations in making the decision to exceed these limitations must be recorded in the project diary.

Personnel assigned to this work should be informed and instructed as to the seriousness of erosion and sediment control. It is also essential that inspection personnel anticipate conditions, during the clearing and grubbing phase, that will result in soil erosion.

Sanctions may be invoked should the Contractor fail to perform erosion control work as required. This is a very serious matter, and the Engineer shall always consult with his Division Engineer and Roadway Construction Engineer prior to invoking these sanctions.

When roads are constructed for the clearing operation, erosion control measures should be installed concurrently.

Consult the permits for artifacts of archeological or historical significance prior to commencing clearing operations.

200-4 CLEARING

Under the provisions of this section, it is necessary that the clearing limits are marked in accordance with the Manual for Construction Layout and the Standard Drawings. In order to do this, both survey party personnel and inspection personnel must be familiar with both Specifications and plan requirements. Prior to staking clearing limits, the plans, including the utility construction, sign and signal plans and permit drawings should be compared to ensure that environmentally sensitive areas are delineated. The permit drawings should govern over the plans for staking purposes. Stakeout should, insofar as possible, include the full width that is to be cleared, including all utility, sign and signal construction in order to eliminate the necessity for recalling the Contractor to enlarge an area on which clearing has been completed and which will result in additional costs.

The Contractor should be advised at the preconstruction conference of the method that will be used to mark clearing limits and this should be documented in the minutes. This is necessary to avoid dispute over what constitutes “initially staked”, Supplemental Clearing and Grubbing, as outlined in the Specifications.

If not required for construction purposes or detailed otherwise in a special provision, clearing of quadrants is considered extra work even though the area may be initially staked. The unit price for “Supplemental Clearing” is usually not appropriate payment (too expensive) for clearing quadrants unless the clearing contractor has to remobilize in order to complete the work. In Divisions where quadrant clearing is routine, this work should be added to the plans and special provisions at the field plan inspections.

The vertical clearing limit is left to the discretion of the Engineer. Vertical shearing of overhanging trees should not be required unless necessary for construction or for the safety of the traveling public. Clearing vegetation in front of signs where necessary to achieve proper sight distance to the sign is considered Supplemental Clearing and Grubbing if such signs are beyond the original project limits. The Engineer should identify the need for these clearing limits.

The Engineer should discuss the preservation of select growth within normal clearing limits, such as shrubs and trees, with the Roadside Environmental Engineer prior to project stakeout.

It is the intent of this provision of the Specifications that if embankment height **under the roadbed (subgrade)** is less than 6 feet, **then the area from toe of fill to toe of fill shall be grubbed**. In any embankment areas that the Engineer deems it unwarranted to grub, in accordance with these guidelines, trees must be cut no higher than 6 inches from natural ground.

At bridge sites, clear the entire right of way for the length of the structure plus 3' on each end. Ensure the permit allows this clearing.

200-5 GRUBBING

This article lists circumstances under which grubbing is not required, and it provides for the smoothing of irregular terrain between construction limits and the limits of clearing and grubbing.

Normally, it is best not to grub any portion of the project that the Contractor will not be actively grading upon (reference Article 200-1 of the Standard Specifications) since grubbing exposes an erodible surface that requires effective siltation control.

In Environmentally Sensitive Areas (ESA), grubbing should be performed no more than 7 days prior to grading operations or as dictated within the permit requirements. When positive drainage is required through an ESA prior to beginning roadway construction, the positive drainage should be established and the area stabilized immediately. When these environmentally sensitive areas are cleared, payment will be provided as Supplemental Clearing and Grubbing due to the increase in mobilizations.

For the purpose of obtaining cross sections with photogrammetry, refer to the Engineering Control section of this manual.

200-6 DISPOSITION OF TIMBER, STUMPS, AND DEBRIS

All timber removed from the project limits will become the property of the Contractor unless otherwise specified by the Project Special Provisions. In addition to verifying the intended disposition of timber in the provisions, the Engineer should also review the right of way agreements to determine if any special handling of timber has been made a part of any agreement. The Engineer should also review the permit conditions to determine if there are requirements to maintain specified trees or plantings. Occasionally, unauthorized removal of timber from the right of way between the date of advertisement and the date of availability has occurred. The Contractor may have based his bidding on selling the timber. Timber should not be removed from within the project limits unless the cutting has been authorized or provided for in the provisions.

Vegetative material including brush, roots, stumps, tree laps, and timber (where the property owner has not been given a right to the timber) shall be disposed of by the Contractor. The Contractor may have the option of either disposing of this material by burning or placing the material in an approved disposal area. Many projects and counties do not allow burning. The Engineer should be familiar with the relevant special provisions and county ordinances. If burning is allowed, the contractor shall be required to secure a permit from the town or local forest ranger. More information is available at <http://daq.state.nc.us/enf/openburn/>.

The Contractor is required to develop and implement a waste area use and reclamation plan for projects involving the disposal of waste, timber, stumps, and debris. Refer to the earthwork section of this manual for details and procedures.

TECHNICIAN'S CHECKLIST
SECTION 200
CLEARING AND GRUBBING

- 1) Become familiar with the Specifications, Plans, Special Provisions, and environmental permits. Be sure the provisions included in the permit(s) are not violated.
- 2) Is clearing and grubbing being performed within required limits and are stumps cut as required when not to be grubbed?
- 3) Is grubbing of environmentally sensitive areas being performed no more than 7 days prior to beginning grading operations in the area?
- 4) Keep an up-to-date estimate of the amount of exposed erodible area as grubbing is performed.
- 5) Discuss necessary erosion control measures with the Engineer and the Contractor's personnel. See that these are promptly installed.
- 6) Be alert for the necessity for additional erosion control measures and discuss with Engineer.
- 7) When the Contractor is given permission to exceed Specifications limitation, is the grubbing area **for the Contractor's convenience**? See that erosion control measures furnished by the Contractor are adequate and prompt. Seeding and mulching the excess area is at the Contractor's expense.
- 8) Is select growth within normal clearing limits to be preserved?
- 9) If burning is being performed, is Article 200-6 of the Specifications being followed? Has the Contractor obtained permits as required?
- 10) Has clearing and grubbing been completed sufficiently in advance of grading to avoid interference with excavation or embankment construction?
- 11) Is there a waste site or a commercial site approved for the clearing debris?
- 12) Has clearing outside of right of way or easements shown on original plans been measured?
Has additional clearing necessary beyond the end stations of the project been measured?
Has clearing for utility, sign and signal construction been staked?
- 13) Are there any signs outside the project limits, which need clearing for site distance?
- 14) Have clearing and grubbing of borrow or material sources (only necessary when furnished by the Division of Highways) been measured?
- 15) Have all private water and sewer lines or septic tanks been plugged and/or removed?
- 16) Have wells been sealed and abandonment forms submitted by the Contractor prior to clearing and grubbing the well site?

SECTION 205 SEALING ABANDONED WELLS

205-1 DESCRIPTION

This section covers the sealing of abandoned wells shown on the plans or any that are directed to be abandoned by the Engineer. This section requires that the work conform to the current requirements of the North Carolina Department of Environment, and Natural Resources (NCDENR).

205-2 CONSTRUCTION METHODS

The abandonment shall be performed by a certified well contractor. The Contractor is required to seal abandoned wells prior to clearing and grubbing. Evidence of the existence of abandoned wells would normally be destroyed during clearing and grubbing. This could result in failure to perform this important item of work, leaving a physical hazard.

Previous editions of this manual have included instructions for the use of common household bleach for disinfecting wells. This procedure is prohibited by NCDENR Ground Water rules in Section **15A NCAC 02C .0113 ABANDONMENT OF WELLS, which states,** "Do not use a common commercial household liquid bleach, as this is too weak a solution to ensure proper disinfection." The abandonment should be performed in accordance with the following rules excerpted from the Department of Environment and Natural Resources website: <http://portal.ncdenr.org>.

North Carolina Administrative Code Title 15A Chapter 27 Sections .0100 - .0900 (Well Contractor Certification Rules) became effective in August 2000. All well construction, installation, repair, alteration or abandonment requires direct supervision by a Certified Well Contractor under these rules, in conjunction with the definitions of "Well Contractor" and "Well Contractor Activity" provided in NC General Statute 87-98.2.

The Engineer should note that county health departments may have requirements beyond that of the Division of Environmental and Natural Resources. The County Health Departments should be consulted to assure compliance in the area in which the work is performed.

It is the Engineer's responsibility to ensure a Certified Well Contractor properly abandons all wells. Failure to properly abandon wells with certified personnel may result in assessment of fines to the Department or to the Contractor. A completed Well Abandonment Record (NCDENR Form GW-30) is to be submitted to the Division of Water Quality, Groundwater Section, with a copy to the Engineer within 30 days after abandonment upon abandonment of each well. NCDOT personnel **should not** sign well abandonment forms.

A list of Certified Well Contractors is maintained by NCDENR and is available online at <http://portal.ncdenr.org/web/eh/wcc>.

15A NCAC 02C .0111 DISINFECTION OF WATER SUPPLY WELLS

All water supply wells shall be disinfected upon completion of construction, maintenance, repairs, pump installation and testing as follows:

Chlorination

- A. Chlorine shall be placed in the well in sufficient quantities to produce a chlorine residual of at least 100 parts per million (ppm) in the well. A chlorine solution may be prepared by dissolving high test calcium hypochlorite (trade names include HTH, Chlor-Tabs, etc.) in water. Do not use stabilized chlorine tablets or hypochlorite products containing fungicides, algaecides, or other disinfectants. Follow manufacturer's directions with storing, transporting, and using calcium hypochlorite products. About three ounces of hypochlorite containing 65 percent to 75 percent available chlorine is needed per 100 gallons of water for at least a 100 ppm chlorine residual.

As an **example**, a well having a diameter of six inches, has a volume of about 1.5 gallons per foot. If the well has 200 feet of water, the minimum amount of hypochlorite required would be 9 ounces. (1.5 gallons/foot x 200 feet = 300 gallons at 3 ounces per 100 gallons; 3 ounces x 3 = 9 ounces.)

- B. The chlorine shall be placed in the well by one of the following or equivalent methods:
- Chlorine tablets may be dropped in the top of the well and allowed to settle to the bottom.
 - Chlorine solutions shall be placed in the bottom of the well by using a bailer or by pouring the solution through the drill rod, hose, or pipe placed in the bottom of the well. The solution shall be flushed out of the drill rod, hose, or pipe by using water or air.
- C. Agitate the water in the well to ensure thorough dispersion of the chlorine.
- D. The well casing, pump column and any other equipment above the water level in the well shall be thoroughly rinsed with the chlorine solution as a part of the disinfecting process.
- E. The chlorine solution shall stand in the well for a period of at least 24 hours.
- F. The well shall be pumped until the system is clear of the chlorine before the system is placed in use.

Other materials and methods of disinfection, at least as effective as those in Item (1) of this Rule, may be used upon prior approval by the Director.

TECHNICIAN'S CHECKLIST
SECTION 205
SEALING ABANDONED WELLS

- 1) Study plans, proposal, and the project site to determine the location of all wells to be sealed. Wells are to be sealed prior to clearing and grubbing the site.
- 2) Has the well been checked for obstructions that would prevent a complete filling of the well?
- 3) Are the personnel sealing the well certified by NCDENR?
- 4) Has water been disinfected?
- 5) Has elevation of consolidated rock been determined?
- 6) Has well abandonment record been obtained from the Contractor within the 30 day time period?
- 7) Has each sealed well been recorded in a Pay Record Book?

WELL ABANDONMENT RECORD



WELL ABANDONMENT RECORD North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # _____

1. WELL CONTRACTOR:

Well Contractor (Individual) Name _____

Well Contractor Company Name _____

STREET ADDRESS _____

City or Town _____ State _____ Zip Code _____

() - _____

Area code - Phone number _____

2. WELL INFORMATION:

SITE WELL ID # (if applicable) _____

STATE WELL PERMIT # (if applicable) _____

COUNTY WELL PERMIT # (if applicable) _____

DWQ or OTHER PERMIT # (if applicable) _____

WELL USE (Check applicable use): ☐ Monitoring ☐ Residential

☐ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural

☐ Recovery ☐ Injection ☐ Irrigation

☐ Other (list use) _____

3. WELL LOCATION:

COUNTY _____ QUADRANGLE NAME _____

NEAREST TOWN: _____

(Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other _____

(Check appropriate setting)

LATITUDE _____

LONGITUDE _____

May be in degrees,
minutes, seconds, or in a
decimal format

Latitude/longitude source: ☐ GPS ☐ Topographic map

(Location of well must be shown on a USGS topo map and
attached to this form if not using GPS.)

4a. FACILITY- The name of the business where the well is located. Complete 4a and 4b.
(If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID # (if applicable) _____

NAME OF FACILITY _____

STREET ADDRESS _____

City or Town _____ State _____ Zip Code _____

4b. CONTACT PERSON/WELL OWNER:

NAME _____

STREET ADDRESS _____

5. WELL DETAILS:

a. Total Depth: _____ ft. Diameter: _____ in.

b. Water Level (Below Measuring Point): _____ ft.

Measuring point is _____ ft. above land surface.

6. CASING: Length Diameter

a. Casing Depth (if known): _____ ft. _____ in.

b. Casing Removed: _____ ft. _____ in.

7. DISINFECTION: _____

(Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:

Neat Cement

Cement _____ lb.

Water _____ gal.

Sand Cement

Cement _____ lb.

Water _____ gal.

Bentonite

Bentonite _____ lb.

Type: ☐ Slurry ☐ Pellets

Water _____ gal.

Other

Type material _____

Amount _____

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

11. DATE WELL ABANDONED _____

I DO HEREBY CERTIFY THAT THIS WELL WAS ABANDONED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR _____

DATE _____

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE _____

(The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C .0113.)

PRINTED NAME OF PERSON ABANDONING THE WELL _____

Submit a copy to the owner and the original to the Division of Water Quality within 30 days.

Attn: Information Management, 1617 Mail Service Center - Raleigh, NC 27699-1617, Phone No. (919) 733-7015 ext 568.

Form GW-30

Rev. 5/06

SECTION 210 DEMOLITION OF BUILDINGS AND APPURTENANCES

210-1 DESCRIPTION

When it has been determined during the purchasing of right of way for a project that specific buildings or appurtenances have no reuse value and are detrimental in appearance, the demolition and removal are placed in the contract as an item to be performed under this section of the Specifications.

The materials resulting from demolition become the property of the Contractor, but **he shall not be permitted to remove the total structure or large sections or portions of structures** for the purpose of reusing these in other locations.

This article is specific as to what portion of a structure is to be demolished under this item of work and what portion is to be a part of clearing and grubbing. Special attention should also be given to the Special Provisions for any other items that may be included as part of the work.

210-2 CONSTRUCTION METHODS

Notification of proper agencies is required prior to building demolition. In addition, inspection of the building to determine the presence of asbestos and the removal of all asbestos discovered is required prior to building demolition. Typically, building inspection and asbestos removal is administered by the Right of Way Branch and completed prior to contract letting.

When the removal, relocation, and/or demolition of buildings is included in a contract, the Engineer should contact the Division Right of Way Agent to ensure that all buildings have been inspected and are asbestos free. The Engineer should obtain copies of asbestos inspection reports and permits from the Division Right of Way Agent prior to or during the preconstruction conference. Copies of these reports should be provided to the contractor by the Engineer.

It is the Contractor's responsibility to ensure that the inspection and all necessary asbestos removal have been completed prior to demolishing the building. The Contractor is also responsible for compliance with all safety codes, State and local laws, and ordinances and damages to adjacent property. The Resident Engineer should call this to the Contractor's attention and assure himself, insofar as possible, that this requirement is not violated.

If an inspection has not been performed, it is the Contractor's responsibility to have the building inspected to determine the presence of asbestos and to develop a disposal plan for the asbestos, if discovered during the inspection. This work will be considered extra work and paid for in accordance with Article 104-7 of the Standard Specifications.

Prior to demolition, removing, or relocating a building, the contractor *must* notify the Health Hazards Control Branch of DHHS. The contractor shall provide notification by submitting Form DHHS 3768 to the Health Hazards Control Branch ***ten working days*** prior to the date demolition, removal, or relocation work is to begin.

Forms are available from:

NC Department of Health and Human Services/Division of Public Health
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, NC 27699-1912
919-707-5950

<http://epi.publichealth.nc.gov/asbestos.html>

The Engineer should ensure that the contractor has submitted Form DHHS 3768 and that demolition, removal, or relocation does not occur prior to the date specified by the contractor on the notification form. Failure to provide notification or beginning work prior to specified date could result in a Notice of Violation (NOV) and fines issued by the Health Hazards Control Branch of DHHS.

When performing building demolition, removal, or relocation in Mecklenburg, Forsyth, and Buncombe Counties, the contractor should contact the local environmental agency prior to beginning work. Notification for building removal, relocation, and/or demolition will be handled through these local environmental agencies instead of DHHS.

The contact person for those counties is as follows:

Buncombe County
WNC Regional Air Pollution Control Agency
(828) 255-5655

Forsyth County
Environmental Affairs Department
(336) 727-8064

Mecklenburg County
Mecklenburg Land Use & Environmental Services Agency
Mecklenburg Air Quality
(704) 336-5500

210-4 DISPOSAL

Disposal by burning is permitted subject to the provisions of Subarticle 107-13 (D), Article 200-5, and Section 802 of the Specifications and all state or local ordinances.

210-5 MEASUREMENT AND PAYMENT

Payment at the contract lump sum price will include all cleanup and disposal, including removal and disposal of asbestos where the presence of asbestos has been noted in the Project Special Provisions.

When the description of the item in the contract does not contain information noting the presence of asbestos and asbestos is discovered after the contract is let, the cost of removal of the asbestos will be paid for as extra work in accordance with Article 104-7 of the Standard Specifications.

TECHNICIAN'S CHECKLIST
SECTION 210
DEMOLITION OF BUILDINGS AND APPURTENANCES

- 1) Study Specifications, plans, and Special Provisions.
- 2) Is the Right of Way being cleared according to plans and Specifications?
- 3) Have all utility companies been notified to disconnect their services and to remove all equipment belonging to them? Does the Engineer have a copy of these notices to the utility companies on file?
- 4) Are all water and sewer lines being plugged in accordance with the terms of the contract?
- 5) Is the disposition of debris being made according to Section 802?
- 6) If burning is performed, is Article 200-5 of the Specifications being followed?
- 7) Was the building properly inspected for asbestos prior to commencement of demolition?
- 8) Was all asbestos properly removed?
- 9) Has the Contractor provided notification of building demolition to the proper agencies 10 days prior to demolition (Form DHHS 3768 rev. 7/08)?
- 10) Has the Contractor performed the work within the dates specified on the notification form? (Demolition **may not** begin prior to the start date established by the Contractor on the notification form).

SECTION 215 REMOVAL OF EXISTING BUILDINGS

215-1 DESCRIPTION

When it has been determined during the purchasing of Right of Way for a project that specific buildings have further value and are reusable, their removal is placed in the contract as an item to be performed under this section of the Specifications.

The Contractor may dispose of buildings removed under the provisions of this section in any manner he may desire.

This article is specific as to what portion of a structure is to be demolished under this item of work and what portion is to be a part of clearing and grubbing. Special attention should also be given to the Special Provisions for any other items that may be included as part of the work.

215-2 CONSTRUCTION METHODS

Refer to Section 210 of this manual for information regarding asbestos inspections, asbestos removal, and building removal notification requirements.

TECHNICIAN'S CHECKLIST
SECTION 215
REMOVAL OF EXISTING BUILDINGS

- 1) Study Specifications, plans, and Special Provisions.
- 2) Is the Right of Way being cleared according to plans and Specifications?
- 3) Have all utility companies been notified to disconnect their services and to remove all equipment belonging to them? Does Engineer have a copy of these notices to the utility companies on file?
- 4) Are all water and sewer lines being plugged in accordance with the terms of the contract?
- 5) Is the disposition of debris being made according to Section 802?
- 6) If burning is performed, is Article 200-6 of the Specifications being followed?
- 7) Was the building properly inspected for asbestos prior to commencement of removal?
- 8) Was all asbestos properly removed?
- 9) Has the Contractor provided notification to the proper agencies 10 days prior to the building removal?
- 10) Has the Contractor performed the work within the dates specified on the notification form? (Removal **may not** begin prior to the start date established by the Contractor on the notification form).

SECTION 220 BLASTING

220-1 DESCRIPTION

GENERAL

This section applies to all types of blasting with the exception of blasting adjacent to highway structures. Refer to section 410-9 when blasting next to highway structures. Submit blasting and post blasting plans.

220-3 CONSTRUCTION METHODS

Notify residents and business owners 48 hours in advance of a blast. The Contractor is responsible for damage and injuries as described in Article 107-11. If wells or springs are damaged, the Geotechnical Unit can assist in determining the Contractor level of liability. Keep a copy of all regulations pertaining to the storage, transportation and use of explosives on site at all times.

The Blaster-in-Charge must have at least 5 years of experience with blasting similar to what is required on the project. When blasting within 1,000ft of a utility or any other structure, supply a blasting and monitoring plan.

See the specification for the specific requirements of the blasting plan. Two copies and a PDF are required. One copy is submitted to the Resident Engineer and the other copy and PDF to the appropriate Geotechnical Engineer.

A predrill meeting may be required prior to blasting. Within 3 days after blasting, submit two copies and a PDF of the post-blast report to the Engineer. The requirements for the report are listed in the specifications.

220-4 MEASUREMENT AND PAYMENT

There is no direct payment for blasting or the associated work. This work is incidental to the work of Unclassified Excavation or Grading. When there is no direct payment for excavation, blasting is incidental to the work contained in the contract and there is no separate payment for blasting.

SECTION 225 ROADWAY EXCAVATION

225-1 DESCRIPTION

GENERAL

It should be noted that this section generally provides for satisfactory disposal of all materials encountered within construction limits, **which are not to be removed under another contract item**. Drainage structures, traffic islands, walls, steps, old curb and gutter, sidewalks, driveways, sawdust piles, junk, trash, debris, private utility lines, underground tanks, etc., are to be removed and satisfactorily disposed of when no other specific item is included in the contract for their removal.

This Section gives the Engineer the right to limit the size of equipment the Contractor is allowed to use under certain circumstances or to require the Contractor to remove equipment from the work site which the Engineer determines is detrimental to the work because of size, weight, etc. This provision is especially important when attempting to construct a roadbed across low swampy areas without first undercutting the area.

225-2 EROSION CONTROL REQUIREMENTS

Article 107-13 of the Standard Specifications, “Control of Erosion, Siltation, and Pollution”, states, “the Contractor shall take whatever measures are necessary to minimize soil erosion and siltation, water pollution, and air pollution caused by his operations.” The most critical elements are the management of earthwork and grading operations. All Sections, within the Specifications, related to these elements reference the requirements for a contractor to conduct operations such that cut and fill slopes are completely graded to final slope in a continuous manner, specifically Articles 225-2, 226-2, 230-2, and 235-3. This requirement to finish slopes in a continuous manner facilitates the establishment of permanent vegetation and reduces the quantity and cost associated with maintenance of erosion control measures, including temporary seeding. The finishing of slopes also progresses the project in that areas are not regraded multiple times. With the above requirements in place, Article 107-13 states, “The Engineer **will** limit the area over which clearing and grubbing, excavation, borrow, and embankment operations are performed whenever the Contractor’s operations do not make effective use of construction practices and temporary measures which will minimize erosion, or whenever permanent erosion control features are not being completed as soon as permitted by construction operations.” Many ICAs and NOV’s have been issued because the contractor had not used proper earthwork management practices and disturbed a substantial amount of the project without finishing areas in a continuous operation. This ineffective method of grading has cost the Department in additional silt excavation, temporary seeding and mulching and most importantly in the relationship established with the regulatory agencies. Therefore, as required in Article 107-13, the Engineer should take action to ensure the contractor is managing their grading operations to minimize soil erosion, and if not providing proper management, limit such grading activities to complete areas in a continuous manner.

It is the intent of this Article of the Specifications that permanent seeding and mulching and other erosion control features be incorporated into the project in a systematic, continuous manner. The Specifications require the Contractor to perform grading operations such that the excavation from any cut and the placement of embankment in any fill shall be a continuous operation to completion. The Specifications also give the Engineer authority to limit the area of exposed erodible slopes to 17 acres if the Contractor has not begun permanent seeding and mulching or other erosion control measures as might be directed by the Engineer. Even when erosion control devices are in place, care must be taken to limit the time bare slopes are exposed. The Specifications also give the Engineer authority to adjust the area limits based on specific circumstances as long as erodible materials are contained within the project limits. As an example: The area limitation can be applied separately to more than one “bona fide” grading crew within any one project as long as permanent erosion control measures are kept up with the grading operations.

The Engineer should closely observe soil and weather conditions, the Contractor’s overall operations, and any other factors that should be considered in ordering the performance of seeding and mulching or construction of other erosion control features. Technicians should be informed and alert for any condition which would result in siltation outside of the project limits

and should be given authority to order protective measures as necessary to correct such conditions.

Any action taken by the Engineer under the provisions of this Article must be fully documented in the project diaries.

This Article provides that work may be suspended due to the failure of the Contractor to comply with erosion control requirements. This act is a serious matter and should not be undertaken by the Engineer without consultation with the Division Construction Engineer and Roadway Construction Engineer and written notification to the Contractor. The suspension may consist of grading operations only or, if more serious, the entire project.

Should the Department of Environment and Natural Resources (DENR) issue a Notice of Violation (NOV), a suspension of the work is expected (after proper written notice to the Contractor). This should remain in effect until the Engineer, Roadside Environmental Field Operations Engineer, Division Construction Engineer, and the Roadway Construction Engineer are confident that erosion control will be satisfactorily completed by the required abatement date.

When it is possible and practicable, bring an area to final line, grade, and finish so that permanent seeding and mulching operations can be performed. If the contractor is not conducting operations in a continuous manner or vegetation is not established within the time frames of the Sedimentation and Pollution Control Act to where permanent seeding can be performed, temporary seeding shall be applied to exposed areas in accordance with Section 1620 of the Specifications and the Contract Special Provisions. The temporary seeding will be at the Contractor's expense. Aside from temporary seeding during clearing operations and winterization of a project, the quantity of temporary seeding should be minor if earthwork is properly managed and permanent seeding performed.

225-3 UNCLASSIFIED EXCAVATION

This Article places the responsibility on the Engineer to see that all material excavated is used in project construction insofar as possible and necessary. The Engineer is also responsible for the decision as to the suitability of materials for use in roadway construction. **High moisture content during excavation is not the sole basis for classifying the material as unsuitable.** The contractor should mechanically manipulate the soils by discing or scarifying to facilitate the drying process.

Further, the Contractor is responsible for keeping the grade drained. If the grade becomes saturated due to lack of proper drainage, the material **will not** be classified as unsuitable and no compensation will be provided for the drying or removal. The Geotechnical Unit should be contacted when the suitability of soils is in question or when soils containing excessive moisture are difficult to compact. They may suggest underdrain, stabilization, undercut or another method to reduce the time and cost to the project.

This article allows the Contractor the option of wasting suitable unclassified excavation prior to completing all embankments and other work on the project requiring utilization of suitable unclassified excavation provided. However, the Contractor must **first sign a supplemental agreement** holding the Contractor liable for any additional costs as a result of this early wasting, including providing any replacement material necessary to complete the project. Upon receipt of the Contractor's request, the Engineer should consult with the Division Construction Engineer or Roadway Construction Engineer before preparing the supplemental agreement. The Geotechnical Unit should be contacted to aid in classifying the soils prior to executing the supplemental agreement.

This Article also allows the Contractor the option, **upon execution of a supplemental agreement**, to waste suitable unclassified excavation and substitute approved borrow material.

The Contractor is still held liable for all additional costs involved, including the Department's additional engineering costs.

When the Contractor requests to utilize rock encountered on the project as rip rap, a like quantity must be replaced with suitable material unless it is a waste project. The quantity of rock, to be used and compensated as rip rap, should be measured in its original position if at all possible; however, if it cannot be, a swell factor of 25% should be used in a truck measurement.

When excess suitable material is encountered on a waste project and the Engineer desires to use that material to flatten embankment slopes, the Division Construction Engineer, the Roadway Construction Engineer, the Roadside Environmental Field Operations Engineer, and the Geotechnical Regional Operations Engineer should be consulted. Geotechnical and environmental permit issues need to be addressed before the contractor is allowed to flatten slopes.

The stockpiling of suitable material for shoulder construction, including the determination of amount required, is the responsibility of the Contractor. The Engineer has the authority to require these stockpiles be constructed in such a manner to cause minimum damage to previously completed seeding and mulching and to facilitate cross sectioning of the stockpile. Topsoil and subsoil materials should be placed in separate stockpiles to avoid mixing of the materials, which would, in effect, contaminate the topsoil. Any material stockpiled for shoulder construction and then used for other purposes shall not be paid as shoulder borrow or as any other contract item. No direct payment will be made for disposal of any excess material stockpiled.

Berm ditches and the vertical curve at the top of the cut slope shall be constructed during the first stages of excavation of the cut. The plans include a detail of this construction.

In roadway cuts, when so directed by the Engineer, the Contractor is required to perform rock undercut to a depth of 12 inches below subgrade in order to provide an earth cushion for the pavement structure. **It is incumbent upon the technician to inspect the subgrade on grading projects and ensure that rock has been removed to a depth of 12 inches below subgrade or finished grade, whichever is lower.**

This inspection may simply involve probing the area in question with a rod or it may be necessary to scarify the subgrade with a motorgrader. The Standard Specifications state that the Contractor may be required to investigate the top 12 inches of subgrade in cut sections to determine the necessity for rock undercut and the Contractor will be paid under Article 104-7. The Technician on the project is in the best position to form an opinion as to whether investigative work should be performed. It is not the intent of this Specification that all cuts on the project be scarified. It is the intent of this Specification that the Engineer and Technician, using their best judgment, require the Contractor to perform investigative work when there is a reasonable probability that rock may be found within 12 inches of subgrade. There may be only a portion of a cut or specific area where scarifying is deemed necessary. The Technician should keep this requirement in mind while observing the grading operation, and a decision should be made as early as possible as to whether or not scarifying will be needed so that the Resident Engineer can negotiate with the Contractor concerning proposed extra work and avoid delaying progress on the project.

On paving projects with previously graded roadbeds, the 12 inches will be measured from the theoretical subgrade shown on the typical section. Subgrade is generally left approximately 0.4 foot high to allow stripping of root mat and to provide cut material for the fine grading operation. Removal of this material up to 0.4 foot is included in the item of fine grading. Excess material removed above the 0.4 foot should be measured and paid as unclassified excavation. Any materials excavated below the fine grading limit would be paid for as undercut.

Careful attention should be given to the necessity for underdrains in rock cuts. Underdrains should be allowed to function for a period of time before earth backfill is begun.

Structure sites should be checked carefully to assure that blasting is completed before structure work is begun. If blasting is necessary after structure work has begun, consult the Bridge Construction Engineer. Also see Article 410-9 of this Manual.

When slides or overbreaks occur and the Engineer is of the opinion that these are due to negligence, he should notify the Division Construction Engineer and Roadway Construction Engineer giving full particulars and requesting an evaluation of the conditions. Should it be determined that the slide or overbreak is due to carelessness or negligence on the part of the Contractor, he shall be notified in writing prior to corrective work beginning, and no payment shall be allowed for that excavation made beyond the typical section lines.

When the Department determines it is necessary to flatten or widen a previously completed cut slope, the Specifications recognize that the Contractor may have justification depending upon the stage of construction for requesting an increase in compensation under the provisions of Article 104-3 of the Specifications above the unclassified excavation unit price. Consideration should be given when widening or flattening a cut slope that has been previously graded to plan typical section.

When any private utility lines, such as (water, sewer, and power) existing shoulder drain or subsurface pipe, or underground tanks not included on the plans are in conflict with construction, the Engineer should make a determination as to ownership and responsibility for movement. The Contractor may be directed to remove these items under the provisions of this Article.

The Division Construction Engineer should be immediately notified when graves or artifacts are encountered. Cease all grading operations in the area until an investigation of the site has been completed. If unmarked human burials or human skeletal remains are involved, the medical examiner of the county shall be notified immediately. Construction activities in the vicinity of these remains shall not resume without authorization from either the County Medical Examiner or the Chief Archaeologist, Archaeology Branch, Archaeology and Historic Preservation Section, Division of Archives and History, and Department of Cultural Resources.

Rock blasting shall be performed in accordance with the Specifications and Project Special Provisions.

If the contractor elects to crush rock encountered within the project limits, the following provisions should be adhere to as a requirement of The Mining Act of 1971:

“The provisions of The Mining Act of 1971 shall not apply to those activities of the Department of Transportation, nor of any person, firm, or corporation acting under contract with said Department of Transportation, on highway rights-of-way or borrow pits maintained solely in connection with the construction, repair, and maintenance of the public road systems of North Carolina; provided, that this exemption shall not become effective until the Department of Transportation shall have adopted reclamation standards applying to such activities and such standards have been approved by the Mining Commission.”

The provisions of this Article shall not apply to mining on federal lands under a valid permit from the U.S. Forest Service or the U.S. Bureau of Land Management.

225-4 UNDERCUT EXCAVATION

The necessity for the work, the amount required, the disposition of the material removed, and the quality of backfill material used are the responsibility of the Resident Engineer. Consultation should be made as necessary with the Division Construction Engineer, the Geotechnical Regional Operations Engineer and Roadway Construction Engineer. If an overrun is anticipated, the Geotechnical Unit shall be requested to investigate and make

recommendations for the most economical alternative. For example, engineering fabric may be utilized to reduce undercutting in many locations. **Large overruns in undercut quantities have resulted in significant contract price increases and time extensions.** Therefore, it is incumbent upon the Engineer to be aware of the quantity of undercut being performed and the impact it is having on project progress.

Shallow Undercut

An effective method to reduce undercut quantities is to utilize the following Shallow Undercuts Provision.

Description

Place and achieve density for Class IV subgrade stabilization material over soil stabilization fabric in areas shown on the plans or directed by the Engineer. Perform undercut excavation as directed.

Materials

Utilize soil stabilization fabric meeting the requirements of Article 270-2 and Class IV Select material meeting the requirements of Article 1016. If Class IV Subgrade Stabilization material does not meet the requirements of Article 1010-1 (ABC), the Engineer may consider the material 'reasonably close' material, and make acceptance in accordance with Article 105-3. Before accepting 'reasonably close' material, the Engineer should consider where and how the material will be used and how the 'reasonably close' portion of the test will affect the engineering quality of the material.

Construction Methods

When shallow undercut is required, undercut 6" to 24". Install fabric and backfill with Class IV Subgrade Stabilization by end dumping and surging the stone forward. Do not operate heavy equipment on the fabric or in the trench. Compact the backfill to 92% or the highest achievable density. The engineer should require the Contractor to make every attempt to achieve 92% density without damaging the underlying layers or utilities. Performing shallow undercut, placing fabric and dumping stone without compacting is not intended.

The trench and backfill should be kept drained until the pavement layers are placed.

Measurement and Payment

See Section 505 – Aggregate Subgrade for further discussion.

Undercut that is between 6" and 24" and is backfilled with fabric and Class IV Subgrade stabilization material is defined as Shallow Undercut and will be measured and paid for by the cubic yard.

Class IV Subgrade Stabilization will be measured and paid for in tons.

Fabric for Soil Stabilization will be measured and paid for in square yards.

There are cases where the Contractor will elect to undercut a stable section during clearing and grubbing in order to generate slope and shoulder material. When undercut is performed for this purpose, and not required by the plans or necessary in order to ensure the integrity of the typical section, there will be no payment for the undercut excavation. As it is desirable to have

this organic material in slopes, the Department has agreed to pay for the borrow necessary to replace the organic material that is stripped from fill sections.

In almost all instances, grade points should be undercut. Even though the existing material may appear satisfactory, experience has shown that problems can develop in the future when a grade point has not been undercut. Before a decision is made not to undercut a grade point, the Engineer should consult with the Division Construction Engineer or Roadway Construction Engineer for concurrence.

Other areas, which show instability due to quality of material, should be undercut and backfilled to provide a uniform and stable embankment foundation. High moisture does not automatically indicate a need to undercut.

Areas of unsuitable material may be shown on the plans. These areas have been determined by geological survey methods and may be above grade and removed as unclassified excavation or below grade and removed as undercut. The Engineer is responsible for the decision as to the size of the area and the quantity of material to be removed. If the area to be undercut is moderately stable and the embankment is not excessively high, it may be prudent to undercut only the roadbed portion of the embankment. Secure the Engineer's approval prior to eliminating any undercut that is shown in the plans.

All material which is judged to be unsuitable for embankment construction, flattening of slopes, and landscaping use shall be disposed of in accordance with the provisions of Section 802 of the Specifications.

225-5 TOLERANCES

A tolerance of +/- 0.1 feet from the established grade applies only to those projects or portions of projects which do not include base and pavement. The completed grade shall be checked by the Technician and recorded in a grade book.

225-6 MAINTENANCE

This Article directs specific attention to the Contractor's responsibility in maintaining the work. Articles 104-10 and 105-16 of the Specifications cover requirements for maintenance and the performance of erosion control work including sanctions, which may be imposed if the Contractor fails to comply with these requirements.

Particular attention should be given to maintenance of the roadbed adjacent to structures to prevent erosion under end bents, wing wall, etc. In the event of erosion under any structure member, care should be exercised to ensure proper compaction of the backfill.

The Engineer should ensure that the project has sufficient preventive maintenance measures or is "winterized" in the event the Contractor elects to suspend operations for any extended period of time. It is the Contractor's responsibility to keep the project properly shaped to drain. The Engineer continuously monitors a project to assure that it is shaped to drain and has appropriate erosion control measures. Any work such as shaping and temporary ditches that might be required to maintain the grade is considered maintenance and is not to be paid for directly.

225-7 MEASUREMENT AND PAYMENT

Special attention should be given to avoid inclusion of excavation quantities which are required to be performed as a part of another item in the contract. Where the contract includes the item of Pavement Removal in areas where excavation is to be performed, the area must be

cross sectioned after the pavement has been removed or a deduction made from excavation quantities based upon the volume of pavement removed as determined from surface measurements and depth of pavement measurements. Where the contract includes the items of Pipe Removal and the pipe is located in an area within the finished graded roadway cross section, the volume of the pipe must be computed and deducted from the excavation quantities. It is not necessary to deduct the quantity of excavation required in removing the pipe. When the pipe is located below the finished graded roadway cross section, no deduction is necessary even if the Contractor elects to remove the pipe prior to grading this section.

The Engineer should make provisions to obtain initial and final cross-sections associated with temporary detours.

Documentation should be made of any unauthorized excavation performed by the Contractor either inadvertently or intentionally. Such work may not be used as a basis for a request for additional compensation upon completion of the project.

TECHNICIAN'S CHECKLIST
SECTION 225
ROADWAY EXCAVATION

- 1) Study Specifications, permit drawings and permit conditions, plans, and Special Provisions.
- 2) Check whether necessary slope stakes have been set, guarded, and offset as necessary.
- 3) See that the Contractor's personnel understand markings of all stakes.
- 4) Check slopes as excavation progresses and document these checks in the project diary.
- 5) Keep Resident Engineer informed as to staking or restaking required.
- 6) Ensure earthwork operations are performed to minimize erosion and cut and fills are pursued in a continuous manner to completion.
- 7) Make a record of date, time, and location of any blasting and document any noticeable results. Require the Contractor to provide records in accordance with Article 107-11 and Section 220.
- 8) Is dust control satisfactory?
- 9) Is maintenance of traffic satisfactory?
- 10) Ensure the Contractor performs erosion control.
- 11) When undercutting is necessary, expedite decision so that the Contractor will not be delayed.
- 12) Check that grade points are undercut to key in embankment.
- 13) Ensure the Contractor works within right of way and easement and protects existing utilities.
- 14) Make notes as to date and time the Contractor enters upon condemned property.
- 15) Determine suitability of excavated material for embankment construction. Material is not considered unsuitable just because it is wet.
- 16) See that berm ditches and earth berms are cut as required to natural contour of ground.
- 17) See that the intersection of slopes and natural ground is uniformly rounded.
- 18) Check slopes under bridges, etc.
- 19) Check to be sure that rock has been excavated 12 inches below the roadbed and ditches.
- 20) See Section 505 for Shallow Undercut

**SECTION 226
COMPREHENSIVE GRADING**

226-3 MEASUREMENT AND PAYMENT

Regardless of the type of pavement encountered, no additional compensation will be provided as all pavement removal is included in comprehensive grading. **Note the listed exceptions to measurement of undercut excavation.**

Backfill material required for pipe culverts is incidental to the item of pipe culvert installation as described in section 300. If more borrow than the amount indicated in the Section 300 Roadway Standard Drawings is required due to unsuitable existing soils conditions, then payment for the additional amount will be made in accordance with Article 104-7.

**TECHNICIAN'S CHECKLIST
SECTION 226
COMPREHENSIVE GRADING**

- 1) Study Specifications, permit drawings and permit conditions, plans, and Special Provisions.
- 2) Check clearing and grubbing limits that have been staked prior to clearing.
- 3) Check grades and slopes that are staked for compliance with plans.
- 4) Check the appropriate section of the Specifications for the operation being performed.
- 5) Check for proper erosion control devices and methods.

SECTION 230 BORROW EXCAVATION

230-1 DESCRIPTION

The Contractor is prohibited from using borrow excavation before all available suitable unclassified excavation has been exhausted except by execution of a supplemental agreement or where construction phasing requires utilization of borrow excavation prior to or in conjunction with utilization of suitable unclassified excavation. The removal of topsoil should be monitored to assure that the Contractor preserves all of it for future use. Careful selection of the stockpile area will help prevent loss of the material by excessive manipulation or erosion.

230-2 COORDINATION WITH SEEDING OPERATIONS

Article 107-13 of the Standard Specifications, "Control of Erosion, Siltation, and Pollution", states, "the Contractor shall take whatever measures are necessary to minimize soil erosion and siltation, water pollution, and air pollution caused by his operations." The most critical elements are the management of earthwork and grading operations. All Sections, within the Specifications, related to these elements reference the requirements for a contractor to conduct operations such that cut slopes are completely graded to final slope in a continuous manner, specifically Articles 225-2, 226-2, 230-2, and 235-1. This requirement to finish slopes in a continuous manner facilitates the establishment of permanent vegetation and reduces the quantity and cost associated with maintenance of erosion control measures, including temporary seeding. With the above requirements in place, Article 107-13 states, "The Engineer **will** limit the area over which clearing and grubbing, excavation, borrow, and embankment operations are performed whenever the Contractor's operations do not make effective use of construction practices and temporary measures which will minimize erosion, or whenever permanent erosion control features are not being completed as soon as permitted by construction operations." Therefore, as required in Article 107-13, the Engineer should take action to ensure the Contractor is managing their grading operations to minimize soil erosion, and if not providing proper management, limit such grading activities to complete areas in a continuous manner.

Erosion control measures directed by the Engineer to prevent erosion and siltation from borrow sources shall be included for payment. Erosion control measures required as a result of the Contractor's negligence will **not** be included for payment.

230-3 MATERIALS

The criteria for borrow material can be found in Section 1018.

230-4 CONSTRUCTION METHODS

(A) GENERAL

The Contractor shall perform staged permanent seeding on all available areas to improve the long-term establishment of vegetation. Established vegetation within borrow pits should be topdressed when the project is topdressed.

The Engineer should ensure that only suitable material excavated from the borrow pit is utilized on the project. Even though a source may have been approved for use, it may contain

pockets of unsuitable material. Frequent visual inspection on the roadway is necessary to prevent this unsuitable material from being incorporated into the project.

When trucks utilize roadways open to public traffic, the Engineer shall require compliance with the provisions of Article 105-15 of the Specifications. In addition, interference with traffic shall be minimized. If the hauling results in the spillage or tracking of material on the pavement, the Contractor should be warned that he is in violation of the Administrative Code pertaining to tracking material on pavement. The Administrative Code states: "No person operating a truck with 'dual wheels' shall track or cause mud to be deposited on the paved portion of any State Highway so as to create a hazard to the traveling public. Any person who causes or permits mud to be tracked or deposited by a truck with dual wheels shall immediately remove the same or cause it to be removed. Any person violating this shall be guilty of a misdemeanor." The provisions of Article 108-7 should be invoked if the requirements of Article 105-15 are not met. It is necessary to construct stone pads at points of entry to travel ways. This should be a part of the Reclamation Plan for borrow pits.

The Engineer should consult with the Division Construction Engineer to determine the need for posting load limit restriction.

(B) CONTRACTOR FURNISHED SOURCES

The Contractor shall submit and obtain approval for a Borrow Pit Reclamation Plan. (See Borrow and Waste Site Reclamation Plan Procedures for Contracted Projects in this section of the manual. Check this link to ensure the most recent version of the Reclamation Plan is used: http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/.)

The Contractor may request to use a "commercial source" as a borrow source. Commercial sources are approved by the Land Quality Section of the Department of Environment, and Natural Resources (DENR). Approval as a commercial source is contingent upon submittal of a Reclamation Plan by the owner of the source and subsequent approval by DENR. Approval of the source is documented by the assignment of a Mining Permit Number by DENR. When the Contractor proposes to utilize a commercial source as a borrow source, the Engineer should request the Contractor to furnish the permit number. If the Contractor cannot furnish the number as requested, the Engineer should notify the Regional Office of DENR. Representatives of DENR will determine if the source is in violation. A commercial source shall not be utilized without a Mining Permit Number.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow pit.

If the Contractor can furnish the permit number, the site may be approved for use as a borrow pit. Approval shall be given in writing. The Engineer should review the mining permit to ensure the borrow site is utilized in accordance with its intended use.

For non-commercial sites or sites developed exclusively for the use of the project, the Contractor and the property owner(s) **jointly** shall submit a Borrow Source Development, Use and Reclamation Plan for each borrow site proposed. This plan shall address in **detail**, with sketches, site maps, boring logs, etc., how the Contractor intends to develop, use, and reclaim the site. Refer to this article for specific instructions on the requirements for the reclamation plan. The environmental assessment is key in the approval process. Once the assessment, performed by a competent individual, is submitted, the Engineer should seek review of the plan from the Division Environmental Officer (DEO) and Roadside Field Operations Engineer (RFOE). A site review by the RE, DEO and RFOE is required prior to approval.

Upon approval of the narrative and the map, the Engineer should document his approval by signing and dating the "Reclamation Plan - Narrative" and the "Reclamation Plan - Maps" or

similar forms as “Approved with the following exceptions:” Any exceptions should be listed in detail. Any necessary modifications should be made by the Contractor and the owner(s) such that approval can be granted without any exceptions. Approval should not be granted until all signatures have been completed.

Payment should be made for all erosion control measures specified in the Reclamation Plan unless otherwise noted in the letter of approval. If payment cannot be made under items included in the contract, a supplemental agreement should be executed. Payment **shall not** be made for erosion control measures required as a result of the Contractor’s negligence. **There is no payment for removing turbidity from water in borrow pits.** Once the water meets the contract permit requirement, then payment for velocity checks and channeling devices necessary to disperse the water into the environment will be made at contract unit prices.

The Engineer is the approving authority for the Reclamation Plan. Each plan should be signed by the Contractor, the property owner(s) and the Resident Engineer. Approval of the Reclamation Plan shall be made in writing. The approved plan shall be distributed as follows: Contractor - 2 copies; Roadway Construction Engineer - 1 copy; Regional Engineer, DENR - 1 copy; and the Resident Engineer’s file - 2 copies. The project Technician should have copy of the plan on the project.

The Engineer **must ensure that the provisions contained in the approved Reclamation Plan are carried out both in letter and spirit.** The Engineer should continually monitor each borrow site to ensure that all requirements of the Reclamation Plan are carried out throughout the life of the project. Final acceptance of the project will be contingent upon meeting the requirements of the Reclamation Plan. A copy of each plan should be made available at the final inspection. Inasmuch as the property owner participated in the development and submission of the plan, it will not be necessary to obtain a release from the property owner for use of the borrow site at the conclusion of the project. However, the property owner is to be notified that work in the pit is complete and any erosion control necessary after final acceptance is his responsibility.

Should the final condition of the pit be acceptable from a Land Quality perspective, but not match the approved reclamation plan, the contractor must revise the plan, complete with owner’s signature, or regrade the pit to match the approved plan.

230-5 MEASUREMENT AND PAYMENT

The Contractor is responsible for balancing the material. If the Contractor hauls too much borrow material to the project and is then forced to waste or otherwise dispose of suitable material from the project, the quantity of surplus material disposed of will be deducted from the quantity of borrow excavation. This may require extensive cross sections or measurements to determine the quantity of surplus material that must be deducted.

Topsoil material will be removed and stockpiled prior to measurement. Measurement will be performed by cross sectioning and computations will be by the average end area method. Payment will be made **after** the stockpiled material has been placed back on the source as part of the reclamation effort.

Two methods of measurement may be used in determining the quantity of borrow material utilized. In-place at the source measurement will be used unless truck measurement is specified in the contract or becomes necessary due to unusual circumstances. When truck measurement is utilized, the volume of the bed hoist box must be deducted from the overall volume of the truck bed. The technicians should ensure the trucks are completely unloaded.

Payment for erosion control measures will not be made when they are required as a result of the Contractor’s negligence.

DEPARTMENT OWNED BORROW

The Contractor is allowed to use borrow material from Department right of way. Before the Contractor is allowed the use of the borrow material from the Department right of way the consideration of how excavating the material will effect adjacent properties and safety. If additional work items are included, such as guardrail or pipe, the expense of material and performance of the work will be the responsibility of the Contractor. In addition, the Contractor must submit a reclamation plan, which includes all the required components. Exceptions are that a SHPO certification will not be required if borrow is obtained from within the right of way and the environmental assessment may be waived if the site is within the project limits and the plans do not indicate the presence of jurisdictional features. The proposed borrow material must be sampled and tested as deemed appropriate by the Resident Engineer.

A supplemental agreement should be executed to document the description, location, terms of the work and establish a new borrow excavation price for the "Department Owned Borrow." The description of the supplemental agreement shall include the following language: **"By execution of this supplemental agreement, the contractor shall waive his rights to an increase in the Borrow Excavation unit price for underruns in accordance with Subarticle 104-5 of the Specifications if specifically created by the utilization of the material generated from the areas detailed herein. Further, the contractor shall have no claim against the Department related to the utilization of this borrow excavation or for the characteristics of the material. The contractor shall make his own determination of the presence of rock and/or other unsuitable material within the referenced areas."** The supplemental agreement should include a line item that deducts the estimated quantity of borrow excavation material at the contract unit price and establish a new line item at the adjusted price for "Department Owned Borrow." If the contract line item for borrow excavation includes a fuel adjustment, the supplemental agreement borrow excavation line item should also include a fuel adjustment.

Establishing the new borrow excavation price is dependent upon the location of the borrow source and the method of excavation. If the borrow source is within the project limits or adjacent to the project and the contractor's planned method of excavation is the same as the method used for unclassified excavation, then the unit price for "Department Owned Borrow" material shall be the lesser of the contract unit price for unclassified excavation and the contract unit price for borrow excavation minus \$0.75. If the borrow material originates from Department owned properties off the project, the new price shall be the contract unit price for borrow excavation minus \$0.75.

Below is an example of establishing the new borrow excavation unit price for "Department Owned Borrow."

The Department has approved the Contractor to use borrow material from Quadrant D from Station 98+70 to Station 100+18 right of the L-line, within the project limits. The Contractor has advised the Resident Engineer that he plans to use the same method and equipment used for unclassified excavation. The estimated amount of "Department Owned Borrow" is 10,000 cubic yards.

| Line Item Description | Unit of Measure | Contract Quantity | Contract Unit Price |
|------------------------------|------------------------|--------------------------|----------------------------|
| Borrow Excavation | Cubic Yards | 482,995 | \$2.60 |
| Unclassified Excavation | Cubic Yards | 2,230,650 | \$1.95 |

Since the "Department Owned Borrow" is within the project limits and the Contractor's method and equipment is the same as that used for unclassified excavation, the new established price for the "Department Owned Borrow" is the lesser of the unit price for unclassified excavation and the contract unit price for borrow excavation minus \$0.75. Comparing the two amounts (\$1.95 and $\$2.60 - \$0.75 = \$1.85$), the lesser amount is the contract price for borrow minus \$0.75; therefore the new established unit price for Department Owned Borrow is \$1.85.

The supplemental agreement for the above example is below.



North Carolina Department of Transportation

Supplemental Agreement Documentation

Contract: C123456

Supplemental Agreement Number: 15

County/Counties: Mayberry

Federal Aid Number: STM-01000(01)

Contractor: ABC Contracting, Inc.

1. Description, Location and justification for change:

Department Owned Borrow:

This Supplemental Agreement is written in accordance with Section 104-3 of the 2006 Standard Specifications for Roads and Structures. By execution of this Supplemental Agreement, the Contractor shall waive his rights to an increase in the Borrow Excavation unit price for underruns in accordance with Subarticle 104-5 of the Standard Specifications if specifically created by the utilization of the material generated for the areas detailed herein. Further, the Contractor shall have no claim against the Department related to the utilization of this borrow excavation or for the characteristics of the material. The Contractor shall make his own determination of the presence of rock and/or unsuitable material within the referenced areas. All work shall be performed as required by section 1510 and as directed by the Engineer. The Contractor's planned method of excavation shall be the same as the method and equipment used for unclassified excavation. The location of the borrow is within the project limits, Quadrant D, from Station 98+70 to Station 100+18 Right of L-line. The prices established herein shall be complete compensation for all tools, equipment, labor and incidentals necessary to complete the work.

2. Estimate of quantities of work resulting from change and the basis for payment:

| Line Item | Description | Unit of Measure | Price | Contract Quantity | Negotiated quantity | Net Change Quantity | Net change Amount |
|-----------|-------------------------|-----------------|--------|-------------------|---------------------|---------------------|-------------------|
| 257 | Borrow Excavation | Cubic Yards | \$2.60 | 0.000 | -10,000.000 | -10,000.000 | -\$26,000.00 |
| 304 | Department Owned Borrow | Cubic Yards | \$1.85 | 0.000 | 10,000.000 | 10,000.000 | \$18,500.00 |

Supplemental Agreement Net Underrun: \$7,500.00

3. Extension of contract time (if applicable):

The contract completion date is extended 0 day(s) in consideration of performance of the affected work.

TECHNICIAN'S CHECKLIST
SECTION 230
BORROW EXCAVATION

- 1) Has the Contractor located borrow sources, obtained permission to sample the sources, and material been approved by the Engineer? See the following pages for "Procedures for Sampling and Approving Contractor Furnished Borrow Sources."
- 2) Have the Contractor **and** the property owner(s) submitted and had approved by the Engineer a Reclamation Plan for **each** borrow site proposed complete with an environmental assessment? See the following pages for procedures.
- 3) Are all clearing and grubbing limits delineated and is the Contractor following the staked pattern?
- 4) Is Article 200-6 being followed for the disposition of clearing and grubbing debris?
- 5) Has the topsoil been removed and stockpiled in a location that will not interfere with the borrow operations? Does this location meet the approval of the Engineer?
- 6) Has the stockpiled topsoil material been properly measured for payment?
- 7) Has the survey crew taken original cross-sections of the source prior to the beginning of excavation of borrow material?
- 8) Has all unsuitable material been removed, measured, and recorded?
- 9) If haul is by truck, is Article 230-5 being followed?
- 10) Are erosion control/turbidity requirements being met?
- 11) Is the borrow site being dressed and shaped in a continuous manner and the stockpiled topsoil material being spread prior to seeding and mulching?
- 12) Has the source been seeded when completed and have the final cross sections of the source area been obtained?
- 13) Is a complete and detailed account of the daily operations being kept in the Technician's Daily Report?
- 14) Has the Contractor complied with the Reclamation Plan for each borrow site?
- 15) Has each borrow site been topdressed?

INTRODUCTION TO BORROW AND WASTE SITE RECLAMATION PROCEDURES

The information on found on the following pages are procedures for Borrow and Waste Site Reclamation for Contracts. This information can be found on the Roadside Environmental Unit's website, with the following web address:
http://www.ncdot.org/doh/operations/dp_chief_eng/roadside/fieldops/downloads/.

Please refer to the Roadside Environmental website for the most current procedures and information regarding borrow and waste site reclamation.

BORROW AND WASTESITE RECLAMATION PROCEDURES FOR CONTRACTED PROJECTS

HISTORY

The Department of Transportation (DOT) is proud of its long standing relationship with the Department of Environment and Natural Resources (DENR). DOT is committed to provide the highest level of environmental stewardship in the protection of our state's natural resources. DOT continues to strengthen and champion the delegated erosion and sedimentation control program from DENR's Sedimentation Control Commission.

DOT operates under its exemption from the Mining Act for borrow pits provided all materials are used "in connection with the construction, repair, and maintenance" of our road system. Therefore, all provisions for erosion and sedimentation control and stabilization with ground cover for waste/borrow sites fall under the conditions of the DOT's delegated program under the Mining Act and the Sedimentation Pollution Control Act.

Currently, DOT requires reclamation plans for all waste/borrow sites. These plans address temporary erosion control, staged seeding and mulching, fertilizer topdressing, and permanent stabilization. Final inspections are conducted on all waste/borrow sites at project completion or prior to project completion if property owners elect to resume/commence agricultural land disturbing activities on the site(s).

In some cases, Land Quality has requested DOT to remobilize to sites years after project completion to address erosion or ground cover issues. This scenario has created liability issues for DOT associated with private property access and project funding availability issues. The reclamation plan is a contractual agreement between DOT, the contractor, and the property owner. In its current format, DOT has no legal authority to access private property once the conditions of the reclamation plan have been fulfilled. Also, funds for project work orders only remain open for one year following project completion.

In an attempt to resolve these issues and comply with the Sedimentation and Pollution Control Act, and the conditional exemption under the Mining Act, DOT and DENR have agreed to the following procedures:

- DOT will revise reclamation plan procedures to make access to waste/borrow sites on private property for up to one growing season after final permanent stabilization, a condition of approval.
- -DOT and DENR will conduct a joint review near the completion of the growing season to ensure sufficient permanent stabilization. If remedial action is needed, DOT will be responsible for implementing corrective measures to obtain permanent stabilization.
- DENR's inspection report will serve as documentation of the final release of liability for DOT.

PLAN PROCEDURE

- The Contractor will submit 10 copies of the pit reclamation plan to the Resident Engineer.
- The Resident Engineer performs a cursory review to determine if the plan is complete and includes the property owner signatures and the environmental assessment.
- The Resident Engineer must make a site visit. It is suggested that the Contractor and Property Owner be contacted and invited to attend this visit. Assure that the haul road is shown on map and note the site distance that will be provided for all vehicles at the proposed intersection.
- The Resident Engineer should assure that an adequate number of devices are specified and sized to control erosion and address drainage. If the site is commercial, the mining permit cover page, location map and site plan shall be submitted by the Contractor. Devices should be sized to comply with Best Management Practices (BMP), including sediment storage volume, surface settling, and spillway capacity.
- Assure that minimum undisturbed vegetated buffers and setbacks have been delineated on the map: eg. 50' riparian buffer for regulated basins and jurisdictional streams, 25' buffer from wetlands (additional buffer areas may be required if it is determined that the regulated wetland and/or stream will be indirectly impacted by borrow pit operations), 50' buffer from trout waters, 10' setback from property lines (local ordinances may require additional setbacks). The environmental consultant should assure that any additional buffers, such as additional buffers around watersheds or live streams not in a currently protected basin, imposed by local or statewide governing bodies, are complied with. Remember that the haul road is a part of the plan and must comply with applicable setbacks.
- If isolated wetlands are located within the site, the consultant must contact the Division of Water Quality for consultation.
- If the site is for waste, the only waste allowed, without a permit from the Solid Waste Division, is for beneficial fill consisting of inert debris strictly limited to concrete (encapsulated rebar is OK), brick, concrete block, uncontaminated soil, rock and gravel. Asphalt, placed a minimum of 4 feet above the water table, is allowed but is not considered beneficial fill. If wood is present in the waste, then the rules for a Land Clearing and Inert Debris Landfill must be followed.
- The Resident Engineer should advise the property owner that a 1 year, post-final compliance review will be held. At that time, any corrective action required will be performed by the Contractor, or by DOT forces or Contractors should the Contractor of record refuse to repair the area.
- After review by the Roadside Environmental Field Operations Engineer, the Resident Engineer will submit approved copies of the map and plan as detailed on the Reclamation Plan Check Sheet. Any revisions must be initialed by the Contractor and Property Owner prior to final approval.
- If the pit is expanded, the original environmental evaluation must have been performed over the area in which the expansion is planned and must account for the expansion and the expanded activity, or a new environmental evaluation must be submitted. It is suggested that the entire parcel be included during the initial environmental evaluation.
- The boundaries of the pit and any environmentally sensitive areas within the pit or within the area of the environmental evaluation must be physically delineated and GPS coordinates must be provided

ENVIRONMENTAL EVALUATION FOR BORROW/WASTE SITE

The attached information is provided to assist you in the review of the necessary documentation to confirm that candidate borrow and/or waste sites do not impact wetlands, surface waters (streams, lakes or ponds), regulated riparian buffers or federally-protected species. The Resident Engineer and Division Environmental Officer will evaluate the environmental documentation that is required, along with the reclamation plan and associated checklist.

Approval of the use of the borrow or waste site for activities exclusively in support of a North Carolina Department of Transportation project will be, in part, dependent on the presence or absence of these sensitive environmental resources at the candidate sites.

In order to provide the necessary environmental documentation to the Resident Engineer and Environmental Officer, it will be necessary for the Contractor to engage the services of a qualified environmental consultant to perform appropriate site investigations that will confirm or refute the occurrence of wetlands, surface waters, regulated riparian buffers and federally protected species within the impact limits of the proposed waste and/or borrow sites and associated access or haul roads.

CONTRACTOR EMPLOYS ENVIRONMENTAL CONSULTANT

In order to ensure that the candidate borrow and/or waste sites have been properly evaluated, the contractor may employ the services of an experienced environmental consultant. The environmental consultant must be competent in the natural sciences, with proficiency in jurisdictional wetland and stream identification and delineation, protected riparian buffer identification, and experience in conducting site investigations for the presence of federally protected species.

Once the consultant has completed thorough field inventories of the candidate borrow and/or waste sites, a concise technical report should be submitted to the contractor, detailing any pertinent findings. The following information should be included in the report:

- General description of candidate site location including a location map, USGS Topographic Map, and a Soil Survey Map.
- General description of the vegetative communities at and adjacent to the candidate site.
- Identification, delineation, and discussion of jurisdictional wetlands at the candidate site (including a discussion of soils, vegetation, and hydrology and completion of USACE wetland data sheets).
- Identification, delineation and discussion of jurisdictional surface waters (streams, ponds or lakes) at the candidate site. If dewatering of the pit is proposed, define the point at which the discharge effluent enters into jurisdictional waters. Include GPS coordinates for upstream and downstream sampling locations.
- Identification, delineation and discussion of regulated riparian buffers at candidate sites and within 50 feet of candidate sites located within river basins that are subject to buffer rules. If a stream, pond or lake is depicted on the most recent U.S. Geologic Service topographic map (1:24,000 scale) or soil survey prepared by the U.S. Department of Agriculture-Natural Resource Conservation Service, (formerly Soil Conservation Service), the system is subject to the riparian buffer rule. The contractor may contact the N.C. Division of Water Quality for an on-site determination to identify inaccurately depicted surface waters or waters that the consultant determines may be blue-lined but are not depicted.

- Evaluation of potential habitat for federally protected species and surveys for federally protected species if habitat is identified at the candidate borrow and/or waste site. Biological conclusions shall be rendered for each species.
- Identification of jurisdictional wetlands, surface waters, and protected riparian buffers at the site or within a 400' perimeter of the site, on appropriate and relevant maps. These types of maps include U.S. Geologic Service topographic map (1:24,000 scale) and soil survey prepared by the U.S. Department of Agriculture-Natural Resource Conservation Service, (formerly Soil Conservation Service), and site map. All copies of the reclamation plan shall include color topographic maps. The maps should be clear enough to allow someone unfamiliar with the locale to travel to the site and identify all points of interest discussed in the report using GPS coordinates (i.e. wetlands, surface waters, regulated riparian buffers and federally protected species). Local roads should be labeled and each map must be prepared to scale. At least one figure should identify the boundaries of the candidate site, using GPS coordinates, within a larger landscape setting. Additionally, boundaries of the candidate site shall be flagged. The environmental consultant shall consider impacts to adjacent wetlands and surface waters within a 400' perimeter of the proposed site. If jurisdictional areas are identified within the proposed pit or the 400' perimeter and dewatering/wet mining/ excavating below seasonal water table or adjacent streambed elevation is planned, the Contractor shall maintain a 400' buffer between the land disturbing activity or obtain concurrence for the proposed activity from the USACE. Any meeting with the USACE will include the Resident Engineer or a member of their staff.
- If water is to be pumped from the site, and the site falls within one of these 15 counties; Beaufort, Carteret, Craven, Duplin, Edgecombe, Greene, Jones, Lenoir, Martin, Onslow, Pamlico, Pitt, Washington, Wayne, Wilson, the contractor's plan to comply with the North Carolina Division of Water Resource's Central Coastal Plain Capacity Use Area rules shall be discussed.
- Qualifications and experience of the investigators and the methodologies employed in the investigation.

The purpose of this report is to verify whether there are wetlands, surface waters, regulated riparian buffers, or federally protected species at the site prior to the initiation of construction activities. The contractor should attach the technical report to the draft reclamation plan at the time the report is submitted to the Resident Engineer. The Resident Engineer will forward a copy of the report to the Division Environmental Officer.

DURING CONSTRUCTION

- Assure that if buffer zones are required, they have been physically delineated and the GPS coordinates compare correctly with the physical delineation.
- Assure that approved sediment controls are adequately installed.
- Require the stockpiling of topsoil for replacement on pit slopes.
- Seed and mulch the stockpile and provide temporary sediment control if needed.
- Inspect each pit at least weekly as a part of the routine weekly erosion control inspection.
- If water is being pumped, ensure that BMP's have been designed, installed, operated, and maintained to minimize turbidity to the extent to avoid habitat degradation or removal of a use designation.
- Limit the erodible slope area to 1 acre prior to beginning seeding.

- Excavate sites in a manner that allows for dressing and seeding of slopes in keeping with the 1 acre tolerance.
- Assure that a minimum of 4 feet of water will remain in the pit if it is to serve as a pond.
- Occasionally check the site for plan conformance and either revise the plan or correct the site.
- Check slope rates during construction. Slopes should be built to plan rates during the initial disturbance to provide the best opportunity for permanent stability and limit the need for temporary seeding.

FINAL INSPECTION

- Compare the final condition of the pit to the plan and amend the plan or the pit if differences exist.
- Assure that a permanent stand of vegetation is covering the pit. The type of vegetation should meet the reclamation plan seed mixture. If necessary, various types of seed should be incorporated into the seed mixture to assure a long lasting, survivable vegetative cover.
- Assure that a minimum of 4 ft. of water is remaining in the pit if it is to serve as a pond.
- Assure that a minimum of 6" of soil, capable of supporting vegetation, is covering waste.
- Ensure that no standing pools of water remain.
- Ensure that all temporary sediment controls have been removed.
- Ensure that the final contours are compatible with the surrounding topography.
- **IN WRITING**, notify the Property Owner that the project is complete and all work on the site is complete. This notification shall refer to the property owner's signed statement allowing site inspections and any repair work during the coming year.

BORROW / WASTE SITE RECLAMATION PLAN MAPS

1. Submit ten (10) copies.
2. Include an inset showing a vicinity map. This vicinity map may be a copy of a county secondary road map.
3. The map will be an accurately scaled drawing, aerial photograph or enlarged topographic map showing the following:
 - a) Property lines, easements and rights of way of the tract(s) of land under consideration.
 - b) Wetlands & buffer zones.
 - c) Blue line streams & buffer zones shown either on topographic maps or soil conservation maps or as field determined by the Division of Water Quality.
 - d) Outline of the proposed pit or waste area.
 - e) Outline of stockpile areas.
 - f) Location of access roads, haul roads and ditches along with proposed sediment and turbidity (if de-watering) control measures.
 - g) Show size and type of specific erosion control measures. Indicate drainage area and disturbed area flowing to each device. Include calculations for time of concentration, sediment storage volume ($3600 \text{ ft}^3/\text{disturbed acre}$), peak flow for design storm ($Q_{10\text{peak}}$ in ft^3/s), surface area in ft^2 ($A = 435.6 * Q_{10\text{peak}}$), basin dimensions (limit depth to 3 ft. max), and stone spillway capacity ($Q = CLH^{1.5}$; limit H to 0.5 ft. max and use $C = 2.5$). Use 25 year design in High Quality Water zones.
 - h) In the event skimmer outlets or flashboard riser outlets are used, sediment storage volume ($1800 \text{ ft}^3/\text{disturbed acre}$), peak flow for design storm ($Q_{10\text{peak}}$ in ft^3/s), surface area in ft^2 ($A = 325 * Q_{10\text{peak}}$), basin dimensions (limit depth to 3 ft. max), and fabric lined spillway capacity ($Q = CLH^{1.5}$; limit H to 0.5 ft. max and use $C = 2.5$). Use 25 year design in High Quality Water zones.
 - i) Show the cross section, eg. 3:1, degree of slope for all slopes, whether fill or cut slopes. Include the cross slope and longitudinal slope of any ditch employed in the plan.
 - j) Map Legend:
 - 1) Name of Contractor
 - 2) Name of Property Owner(s)
 - 3) North Arrow
 - 4) County
 - 5) Project Number or WBS Element
 - 6) Contract Number
 - 7) TIP Number
 - 8) Scale
 - 9) Date Prepared



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RECLAMATION PLAN CHECKLIST FOR CONTRACTED PROJECTS

Date Received: _____

Borrow Pit ()

Waste Site ()

Contract Number: _____ TIP Number: _____

Project # / WBS Element: _____

Property Owner: _____

Address: _____

Pit Address: _____

(if different) _____

Description: _____

| | YES | NO | N/A |
|--|-----|----|-----|
| 1. For Division Operation Projects, has a Minimum Criteria Determination Checklist been performed and copy attached? | | | |
| 2. Is the source commercial? | | | |
| 3. If commercial, has: | | | |
| a. Mining permit number been provided? | | | |
| b. Copy of Mining Permit cover page submitted? | | | |
| c. Copy of site plan submitted? | | | |
| Commercial Permit Number: _____ | | | |
| 4. If there is no permit number has the DENR Regional Engineer been notified? | | | |
| 5. Has the Reclamation Plan been submitted | | | |
| Narrative | | | |
| Map | | | |
| 6. Are all required signatures on narrative and map? | | | |
| 7. Does map include vicinity map? | | | |
| 8. Has site inspection been made? (Property owner invited?) | | | |
| 9. Are all questions satisfactorily answered on narrative? | | | |

| | YES | NO | N/A |
|---|-----|----|-----|
| 10. Is a letter from the SHPO attached & any required conditions complied with? | | | |
| 11. If this is a waste site, has the type of debris and the amount of cover been addressed? | | | |
| 12. Are Map Items Included? | | | |
| Name of Contractor | | | |
| Name of Property Owner | | | |
| North Arrow | | | |
| County | | | |
| Project No. | | | |
| Scale | | | |
| Date Prepared | | | |
| 13. Has the Environmental Evaluation been submitted? | | | |
| Are wetlands present? | | | |
| Have blue line streams been delineated? | | | |
| Are buffer rules applicable? | | | |
| If yes, has diffuse flow been provided? | | | |
| Has a physical method of delineating buffers been described? | | | |
| Are applicable setbacks shown? | | | |
| Has the DEO reviewed the assessment? | | | |
| Has the Roadside Environmental Field Operations Engineer reviewed the plan? | | | |
| 14. Are slope rates indicated? | | | |
| ≥ 3:1 for Coastal Plain Borrow | | | |
| ≥ 2:1 for Statewide Criteria | | | |
| 15. Will water remain in the pit? | | | |
| Is the current water table elevation indicated? | | | |
| Is the proposed depth of water in the pond indicated? | | | |
| 16. Will the excavation require temporary de-watering? | | | |
| Impacts to adjacent wetlands? | | | |
| Method for controlling and reducing turbidity to levels acceptable to DWQ prior to discharge indicated? | | | |
| If within 15 county CCPCUA region is the responsible person listed? | | | |
| If within CCPCUA region are wells identified with GPS? | | | |
| If within CCPCUA region and pumping is required, are pump discharge coordinates indicated? | | | |
| 17. Are haul roads shown in the plan? | | | |
| 18. Are construction entrances shown and detailed on the plan? | | | |
| Is sight distance adequate where trucks will enter an existing roadway? | | | |
| 19. Have temporary devices been checked for location and size? (size, surface area, spillway capacity) | | | |

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| | YES | NO | N/A |
|--|-----|----|-----|
| Has the method of maintenance for devices been described? | | | |
| Is the cross slope rate of temporary ditches, including de-watering excavation, indicated?(typ. \geq 2:1) | | | |
| | | | |
| 20. Is staged seeding, per acre of exposed erodible slope, provided for? | | | |
| Is the seed mixture indicated and is it acceptable? Will the indicated mixture provide long term vegetative cover? | | | |
| | | | |
| 21. Is maintenance of the site by the property owner or contractor, after final acceptance, accounted for? | | | |
| | | | |
| 22. Have submittals been signed? | | | |
| | | | |
| 23. Have approval letters and approved plans been sent and distributed? | | | |
| Contractor – w/2copies | | | |
| Resident Engineer – w/2copies | | | |
| Project Inspector – w/1 copy | | | |
| Division Engineer – w/1copy | | | |
| DENR Regional Engineer – w/1copy | | | |
| Roadside Environmental Field Ops. Engineer – w/1copy | | | |
| Roadway Construction Engineer – w/1copy | | | |
| Property Owner – w/1copy | | | |
| | | | |

Comments:

(Reviewed by: Signature)

(Date/Time)

**RECLAMATION PLAN FOR CONTRACTED PROJECTS
BORROW PITS**

Date: _____

Contract Number: _____ TIP No.: _____

Project # / WBS Element: _____ County: _____

Contractor: _____ Person
Responsible _____

Contractor Address: _____

Property Owner: _____ Phone Number: _____

Property Owner Address: _____

Property Address: _____

Total acreage of proposed pit: _____

Expected depth of excavation: _____

Present use of land: _____

Proposed use after reclamation: _____

Proposed sequence of excavation (include amount of clearing & proposed slope rates):

Did the Environmental Evaluation indicate the presence of any wetlands or endangered species?
(If yes, briefly list findings and indicate physical means by which buffer zone will be delineated):

Is any portion of the pit or access & haul roads within a watershed with riparian buffer zone requirements? (If yes, indicate physical means by which buffer will be delineated and how diffuse flow into the buffer zone will be maintained):

Is the site adjacent to High Quality Waters as defined by the Department of Environment and Natural Resources? (If yes, note how the devices have been designed to meet DENR requirements):

Is a letter from the State Historic Preservation Office attached & conditions complied with?:
(check one)

YES ()

NO ()

Describe the intended plan for the reclamation and subsequent use of all affected lands, and indicate the general methods to be used in reclaiming this land, including any stockpile areas, haul roads and ditches. Describe the sequence for reclaiming the pit. Attach a map which illustrates this plan, showing the location and design of all temporary and permanent erosion control devices. All features must comply with the appropriate specifications, standards and reflect Best Management Practices (BMP). The plan must indicate setbacks to adjacent properties, buffer zones and if de-watering is required and the pit is located within the 15 county region of the CCPCUA, the GPS coordinate location of any well located within 1500 ft. of the pit.

Will excavation extend below the water table? (If yes, see a, b, & c, below):

a) Specify how de-watering will be accomplished. Include proposed method of reducing effluent turbidity so that it meets the requirements of the Division of Water Quality. Show any settlement basins, construction details, and calculations on the plan:

b) If the pit is within the Central Coastal Plain Capacity Use Area, list the person responsible for completing the Division of Water Resources CCPCUA spread sheet and method of submission to the Resident Engineer:

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c) If water is to remain in the pit after completion, state the estimated depth of the water (minimum depth = 4'). Indicate the water table depth prior to beginning excavation and the method used to obtain this information:

Describe the proposed schedule of permanent seeding and mulching. Detail the frequency of permanent seeding and mulching. Note that a permanent stand of vegetation is required prior to a final inspection:

Property Owner's Statement:

I hereby certify that I am in agreement with this development, use, and reclamation plan, and any exceptions noted when approved by the Engineer, and that I understand that I will be responsible for the site upon completion of its use in the construction of the project noted in the map legend. I understand that this plan, when approved, will serve as a guide in controlling erosion and sediment in accordance with the Mining Act and the Sediment and Pollution Control Act and as enforced by the North Carolina Department of Environment and Natural Resources (DENR). I understand that any work exceeding the minimum necessary for compliance with DENR requirements, should be negotiated between the Contractor and the Property Owner. My signature below authorizes The Department of Transportation (DOT), the Department of Environment and Natural Resources (DENR) or its agents, to enter upon my property for a period of one year from the date of final acceptance of the project for which this site plan is executed. If necessary, the DOT will be allowed to have the Contractor repair any areas that are not in compliance with DENR requirements. After a one year inspection is held, I will be solely responsible for assuring that the site is in compliance with DENR regulations. I have the right to change the condition of the site after the final inspection and prior to the one year follow-up inspection. However, if I make such changes, I acknowledge that DOT is released from all obligations and conditions of this agreement and I will become solely responsible for the condition of the site beginning on the date that I change the final inspection condition.

1/10/07

Signatures:

Contractor's Representative:

(authorized to sign supplemental agreements/date)

Owners of record:

Witness

Owner

(signature/date)

(signature/date)

(signature/date)

(signature/date)

(signature/date)

(signature/date)

Resident Engineer:

(signature/date)

Exceptions:

Concurrence with exceptions:

Property Owner:

Contractor:

(signature/date)

(signature/date)

Attachments: Site map with details
Environmental Evaluation

cc:

**RECLAMATION PLAN FOR CONTRACTED PROJECT
WASTE SITE**

Date: _____

Contract Number: _____ TIP No.: _____

Project # / WBS Element: _____ County: _____

Contractor: _____ Person
Responsible _____

Contractor Address: _____

Property Owner: _____ Phone Number: _____

Property Owner Address: _____

Property Address: _____

Total acreage of proposed pit: _____

Expected depth of excavation: _____

Present use of land: _____

Proposed use after reclamation: _____

Expected type of waste that will be place in the site (examples: asphalt, concrete, soil stone):

Proposed sequence of placing waste (include proposed slope rates):

Did the Environmental Evaluation indicate the presence of any wetlands or endangered species? (If yes, briefly list findings and physical means by which area will be delineated.)

Is any portion of the pit within a watershed with riparian buffer zone regulations? (If yes indicate physical means by which buffer will be delineated and how diffuse flow will be maintained.)

Is the site adjacent to High Quality Waters as defined by the Department of Environment and Natural Resources? (If yes, note how the devices have been designed to meet DENR requirements.)

Is a letter from the State Historic Preservation Office attached & conditions complied with? (Check one.)

YES ()

NO ()

Describe the intended plan for the reclamation and subsequent use of all affected lands, and indicate the general methods to be used in reclaiming this land, including any stockpile areas, haul roads and ditches. Describe the sequence for reclaiming the site. Attach a map illustrating this plan, showing the location and design of all temporary and permanent erosion control devices. All features must comply with the appropriate specifications, standards and reflect Best Management Practices (BMP). The plan must indicate setbacks to adjacent properties, buffer zones and wetlands.

Describe the proposed schedule of permanent seeding and mulching. Detail the frequency of permanent seeding and mulching. Note that a permanent stand of vegetation is required prior to a final inspection.

Property Owner's Statement:

I hereby certify that I am in agreement with this development, use, and reclamation plan, and any exceptions noted when approved by the Engineer, and that I understand that I will be responsible for the site upon completion of its use in the construction of the project noted in the map legend. I understand that this plan, when approved, will serve as a guide in controlling erosion and sediment in accordance with the Mining Act and the Sediment and Pollution Control Act and as enforced by the North Carolina Department of Environment and Natural Resources (DENR). I understand that any work exceeding the minimum necessary for compliance with DENR requirements, should be negotiated between the Contractor and the Property Owner. My signature below authorizes The Department of Transportation (DOT), the Department of Environment and Natural Resources (DENR) or its agents, to enter upon my property for a period of one year from the date of final acceptance of the project for which this site plan is executed. If necessary, the DOT will be allowed to have the Contractor repair any areas that are not in compliance with DENR requirements. After a one year inspection is held, I will be solely responsible for assuring that the site is in compliance with DENR regulations. I have the right to change the condition of the site after the final inspection and prior to the one year follow-up inspection. However, if I make such changes, I acknowledge that DOT is released from all obligations and conditions of this agreement and I will become solely responsible for the condition of the site beginning on the date that I change the final inspection condition.

Signatures:

Contractor's Representative:

 (authorized to sign supplemental agreements / date)

Owners of record:

Witness

Owner

 (signature/date)

 (signature/date)

 (signature/date)

 (signature/date)

 (signature/date)

 (signature/date)

Resident Engineer:

 (signature /date)

1/10/07

Exceptions: _____

Concurrence with exceptions:

Property Owner: _____ Contractor: _____
(signature/date) (signature/date)

Attachments: Site map with details
Environmental Evaluation

cc:

BORROW PIT SAMPLING

February 5, 2003

REVISED June 4, 2003

(Note – The following pages are excerpted from the Borrow Pit Sampling Training)

Soils Sub-Unit
Materials and Tests Unit
North Carolina Department of Transportation

SECTION 1 - PURPOSE

The **purpose** of this school is to explain the techniques for obtaining soil samples from a proposed borrow pit. A borrow pit is generally utilized by the Contractor when a project requires a larger amount of fill material versus amount of usable material obtained from cut sections. Due to the various soil types in North Carolina, a proposed borrow pit must be sampled and tested for approval.

SECTION 2 - IMPORTANCE OF PROPER SAMPLING

A **sample** is defined as a “portion, piece, or segment that is representative of a whole”. It is therefore important that the procedure(s) used to obtain this small portion not compromise the requirement that it be a representative of the larger portion. As will be discussed in the sections that follow, each borrow pit sample will be taken to a NCDOT laboratory and tested for AASHTO (American Association of State Highway Transportation Officials) soil classification. The AASHTO classification is utilized to determine if the soil has the desired engineering properties (i.e. load-carrying capacity). Unsuitable soils placed in an embankment or subgrade may cause structural failure in the roadway leading to costly maintenance repairs; therefore, following proper sampling procedures can not be overemphasized.

SECTION 3 - AASHTO CLASSIFICATION SYSTEM

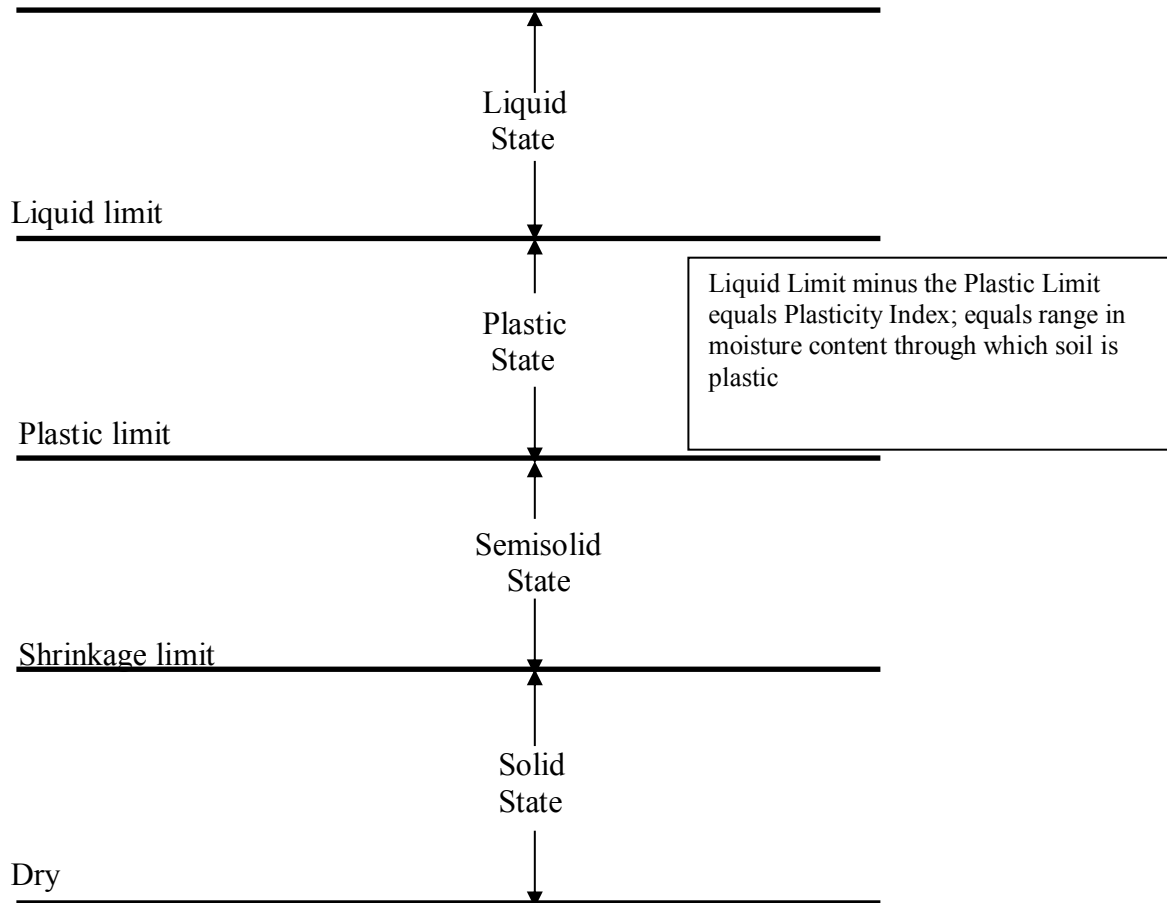
The American Association of State Highway Transportation Officials has adopted a standardized method for determining soil classification. Soils are grouped by the same general load-carrying capacity from the best being A-1 to the worst being A-7. There is a wide range of load-carrying capacity within groups and overlapping of capacity between groups. For example, an A-2 soil may contain material that makes it inferior to a specific A-5 soil. A Group Index number is used to designate the load-carrying capacity within the same AASHTO classification. For example, an A-4 (5) and A-4 (20) have the same classification, however the group index number indicates that A-4 (5) has the greater load-carrying capacity.

To determine AASHTO classification for a particular soil, several tests must be performed. First, the overall distribution or “gradation” of particle sizes is analyzed by performing AASHTO T-88. During this test a representative amount of the soil sample is screened over specific sieves to determine the percent passing each sieve. The second step is to determine the Liquid Limit, Plastic Limit, and Plasticity Index. These tests are commonly referred as the Atterburg Limits of the soil. AASHTO T-89 is performed to determine the Liquid Limit (L.L.) of the soil. The Liquid Limit is defined as the moisture content where the soil passes from the plastic state to the liquid state. A high Liquid Limit indicates a high clay content and low load-carrying capacity. AASHTO T-90 is also performed on a soil sample to determine the Plastic Limit (P.L.) and the Plasticity Index (P.I.) of a soil. The Plastic Limit is defined as the moisture content at which the soil changes from a semisolid state to a plastic state. Load-carrying capacity of a soil increases rapidly below the Plastic Limit and decreases rapidly above the Plastic Limit. The Plasticity Index is defined as the numerical difference between the Liquid Limit and the Plastic Limit. Refer to the formula given below:

$$P.I. = L.L. - P.L.$$

Figure 1 shows how a soil can pass through the different states of consistency depending on the amount of water in the soil.

Figure1:



The results from each AASHTO test are used to determine the soil classification. **Table 1** lists the main AASHTO groups followed by a general description.

Table1:

| AASHTO CLASSIFICATON | GENERAL DESCRIPTION |
|----------------------|--|
| A-1 | Well graded coarse to fine; non-plastic or feebly plastic; includes coarse without binder |
| A-1-a | Mostly stone fragments or gravel |
| A-1-b | Mostly coarse sand; may need added fines for a firm base; suitable or can be made suitable for granular base coarse |
| A-2-4 A-2-5 | Granular with binder characteristics of A-4 and A-5 soils |
| A-2-6 A-2-7 | Granular with binder characteristics of A-6 and A-7 soils |
| A-2 | Soils are inferior to A-1 soils due to poor grading, inferior binder, or both generally are suitable as a blanket for very plastic subgrades slated to receive concrete pavement |
| A-3 | Sands deficient in soil binder and coarse material; equigranular; examples are fine beach or desert blown sands. Water has little affect on A-3 soils |
| A-4 | Composed mostly of silt with only moderate to small amounts of coarse material and only small amounts of clay; can vary texturally from sandy loams to silt to clay loams |
| A-5 | Similar to A-4 except that they include very poorly graded soils containing such things as mica; is a poor stability soil. |
| A-6 | Composed predominately of clay with moderate to negligible amounts of coarse material; have low stability at high moisture contents but are pretty stable otherwise; show shrinkage cracks during dry weather; is a good soil other than the fact that it has great affinity for water |
| A-7 | Composed predominately of clay like A-6 but due to the presence of one-size silt particles, organic matter, mica flakes, or lime carbonate, is elastic |
| A-7-5 | Moderate plasticity indexes; may be highly elastic. P.I. less than or equal to L.L. -30 |
| A-7-6 | High plasticity indexes P.I. greater than L.L. -30 |

Table 2 shows the AASHTO Classification along with the maximum percent passing allowed for each sieve. Maximum limits are also shown for Liquid Limit and Plasticity Index and a general rating for use in subgrade is provided.

Table 2:

| General Classification | Granular Materials (35% or less passing the 0.075 mm sieve) | | | | | | | Silt-Clay Materials (>35% passing the 0.075 mm sieve) | | | |
|---|---|--------|-----------|---------------------------------|--------|--------|--------|---|--------|--------------|---------------------|
| Group Classification | A-1 | | A-3 | A-2 | | | | A-4 | A-5 | A-6 | A-7 |
| | A-1-a | A-1-b | | A-2-4 | A-2-5 | A-2-6 | A-2-7 | | | | A-7-5 |
| | | | | | | | | | | | A-7-6 |
| Sieve Analysis , % passing | | | | | | | | | | | |
| 2.00 mm (No. 10) | 50 max | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 0.425 (No. 40) | 30 max | 50 max | 51 min | ... | ... | ... | ... | ... | ... | ... | ... |
| 0.075 (No. 200) | 15 max | 25 max | 10 max | 35 max | 35 max | 35 max | 35 max | 36 min | 36 min | 36 min | 36 min |
| Characteristics of fraction passing 0.425 mm (No. 40) | | | | | | | | | | | |
| Liquid Limit | ... | | ... | 40 max | 41 min | 40 max | 41 min | 40 max | 41 min | 40 max | 41 min |
| Plasticity Index | 6 max | | N.P. | 10 max | 10 max | 11 min | 11 min | 10 max | 10 max | 11 min | 11 min ^o |
| Usual types of significant constituent materials | stone fragments, gravel and sand | | fine sand | silty or clayey gravel and sand | | | | silty soils | | clayey soils | |
| General rating as a subgrade | excellent to good | | | | | | | fair to poor | | | |

*Plasticity index of A-7-5 subgroup is equal to or less than the LL - 30. Plasticity index of A-7-6 subgroup is greater than LL - 30

SECTION 4 - SOIL TERMINOLOGY AND IDENTIFICATION PROPERTIES

When sampling a borrow pit, the boring log must be completed with a description of the soil texture and color. Approximations of the soil texture should be made in the field by the feel of the moist soil when it is rubbed between the thumb and index finger. The textural types and description are listed on **Table 3**.

Table 3:

| TEXTURAL TYPE | DESCRIPTION |
|---------------|--|
| Sand | Can see and feel the grains; moist cast crumbles |
| Sandy Loam | Mostly sand but contains a little silt and clay; moist cast has small amount of stability |
| Loam | Has almost equal amounts of sand, silt, and clay; slightly gritty but fairly smooth; stable cast when moist |
| Silt Loam | Is mostly silt with some fine sand and a little clay; dry and moist casts are stable; will not roll into smooth, unbroken ribbon but will have broken appearance |
| Clay Loam | Is fine textured; cloddy when dry; will form a thin ribbon which breaks easily; very stable cast when moist |
| Clay | Is fine textured; very hard clods when dry; will form a long thin ribbon when rolled; includes pipe clay and gumbo |

Color can also be useful for locating different soil types and determining their limits within the soil column. **Table 4** lists the indicative colors and general description.

Table 4:

| INDICATIVE COLORS | DESCRIPTION |
|--------------------------------------|--|
| Black to Dark Brown | Presence of organics |
| Reddish | Presence of unhydrated iron oxides (hematite) and are generally well drained |
| Yellow & Yellow Brown | Presence of iron and poorly drained |
| Greyish blue & Grey & Yellow mottled | Poor drainage |
| White | Presence of considerable silica, lime, or aluminum compounds |

The data obtained from the field investigation and the Soils Laboratory test results will serve to establish a soil profile of the borrow pit. The soil profile is the vertical cross-section composed of three major layers designated as A, B, and C-horizons.

Horizon A: basically topsoil containing organic matter except for possibly the bottom part of the layer

Horizon B: the subsoil

Horizon C: the mother soil

The usable soil can primarily be found in the B-horizon; however, the lowest portion of the A-horizon and the top part of the C-horizon may also contain usable material.

SECTION 5 – GENERAL SAMPLING PROCEDURES

When sampling a borrow pit, the Contractor or NCDOT may obtain the soil samples. The sampling procedures outlined below shall apply to either the Contractor or NCDOT.

1. Prior to performing any sampling, the Contractor shall furnish the Resident Engineer with a dimensioned plat of the proposed site to a scale such that the plat can be placed on 8 ½" X 11" or 11" X 17" sheet. The Contractor shall also provide a release from the property owner allowing access to the property and the right to obtain samples from the property.
2. Samples shall be obtained by the use of hand auger or power flight auger. Other equipment such as a dragline or backhoe may be used if approved by the Engineer.
3. Each sample shall consist of 5 to 8 pounds of soil (fill sample bag one quarter full). Place a **completed** sample card (refer to Appendix C) in each bag.
4. A minimum of two (2) test borings per acre will be required. The minimum number shall be increased if determined necessary in order to obtain representative samples for the entire source.
5. Each test boring shall be identified by a stake driven adjacent to the test boring hole. The test boring number shall be shown on the stake.
6. Within each boring site samples will be acquired from any significantly different layer of soil. Combining materials from different layers into a composite sample will not be permitted.
7. Each test boring shall be designated numerically (S-1, S-2, S-3, etc.) in the order of drilling.
8. The first sample from a test boring shall be identified by the test boring number. Any additional samples from a test boring shall be identified by the test boring number plus an alphabetical letter (S-1, S-1A, S-1B, etc). These additional samples shall be designated alphabetically in order from the surface down.
9. A boring log shall be kept of each test boring and will show the following:
 - a. Test boring number
 - b. Visual description of the material encountered
 - c. Elevation or depth below surface of layer of material encountered
 - d. Location of samples obtained
 - e. Location of water table
 - f. Total depth of boring
10. For each source, a site map shall be prepared showing the following:

- a. The location of the source in relation to natural landmarks, property lines and/or existing public roads in the area.
- b. A plan view of the property and all test borings with identifying numbers labeled

SECTION 6 – SAMPLING PROCEDURES – CONTRACTOR

If the Contractor performs sampling, the following procedures will apply in addition to the procedures listed in the previous section.

1. The Contractor shall furnish all sampling equipment.
2. A Division of Highways representative shall determine the frequency and location of all test borings.
3. All samples will be taken in the presence of the Resident Engineer or his/her representative.
4. The Resident Engineer shall be responsible for ensuring that sufficient test borings are made and samples taken are representative of the proposed source.
5. The Contractor will be responsible for marking and placing an identifying stake at each boring site.
6. The Division of Highways representative shall transport all samples to a Materials and Test Unit laboratory. The Contractor shall not deliver any samples for testing. The Division of Highways will be responsible for any soil treatment necessary because of quarantine regulations of the U. S. and/or N.C. Department of Agriculture.
7. The Division of Highways representative shall maintain the boring log and prepare the site map. Upon completion of the investigation, one (1) copy of each will be transmitted to the Materials and Tests Unit.

SECTION 7 – SAMPLING PROCEDURES – NCDOT

If the Department performs sampling, the following procedures will apply in addition to the procedures listed in the general sampling section.

1. The Contractor's request for Department to perform the sampling shall be submitted to the Resident Engineer in writing.
2. The Resident Engineer will forward the request and the other required data to the Geotechnical Engineering Unit.
3. The Geotechnical Engineering Unit, prior to performing any sampling, will contact the Resident Engineer to determine if he/she desires that project personnel be present.
4. The Geotechnical Engineering Unit will obtain the samples and transport them to a Materials and Tests Unit laboratory for testing.
5. The Geotechnical Engineering Unit will be responsible for marking and placing an identifying stake at each boring site.
6. The Geotechnical Engineering Unit will be responsible for any soil treatment necessary due to quarantine regulations of the U. S. and/or N. C. Department of Agriculture.

7. The Geotechnical Engineering Unit will be responsible for submitting cost data to the Finance Department for invoicing the Contractor.

SECTION 8 – APPROVING BORROW SOURCE

The Material and Tests Unit will submit copies of all test reports to the Resident Engineer for analysis. The Resident Engineer, utilizing the latest revision of the “Criteria for Acceptance of Borrow Material” (refer to appendix A), will analyze the test results, boring logs, and site map to determine the acceptability of the source. The Resident Engineer will also consider any applicable project special provisions as the basis for making the determination. The Geotechnical Engineering Unit, if requested, will assist the Resident Engineer in evaluating the material. The Resident Engineer will advise the Contractor in writing the following issues:

1. The limits of acceptable material.
2. If special handling of the material is necessary.
3. Approval of the source for borrow material is based on the limited sampling and test results of the samples submitted. Therefore, such approval is with the understanding that the Division of Highways reserves the right to use visual inspection and additional sampling on the roadway, as deemed appropriate by the Engineer, to reject any unsuitable material encountered. The rejection may occur regardless of whether or not such material was indicated as acceptable during initial borrow pit sampling.
4. Where deemed appropriate, the Resident Engineer will designate how the material is to be removed from the pit and also where to isolate areas or layers of unsuitable material in the pit.
5. Any material found on the roadway that fails to meet the acceptability requirements, shall be removed and replaced with acceptable material at no cost to the Department.

APPENDIX A
North Carolina Department of Transportation
Division of Highways
Criteria for Acceptance of Borrow Material

I. Statewide Criteria: (See exceptions in II)

Only natural earth materials may be used as borrow material. Any other materials are subject to rejection (see II-b).

Soil with P. I. of 25 or less..... Acceptable

Soil with P. I. of 26 thru 35..... Acceptable, but not to be used in top 2 ft.
of embankment or backfill.

Soil with P. I. of more than 35..... Not acceptable

II. Exceptions to Statewide Criteria:

a) Soils in the Coastal Plain (area described below) shall be accepted in accordance with the following:

Soils with P. I. of 15 or less.....Acceptable

Soils with P. I. of 16 thru 20.....Acceptable, but not to be used in top 2 ft. of
embankment or backfill.

Soils with P. I. of more than 20.....Not acceptable

Areas Applicable:

Division 1....Entire Division except Northampton (West of I-95)

Division 2....Entire Division

Division 3....Entire Division

Division 4....Edgecombe, Wayne, Johnston, (East of US-301)

Wilson (East of I-95), Nash (East of I-95), Halifax (East of I-95)

Division 6....Bladen, Columbus, Robeson, Cumberland,

Harnett (South of NC-27)

Division 8....Scotland, Hoke, Moore (Southeast of US 15-501, NC-

73, NC-211), Richmond (East of US-220) North and

US- 1 South)

*Also applicable to the floodplains of the Roanoke, Tar, Neuse, Cape Fear, and Lumber Rivers and their tributaries which are outside the above described areas.

b) Waste or by-products from industrial processes or mining operations are not acceptable except by specific, written approval of the Engineer. This includes soil overburden from quarries.

c) When tested, soils having a pH less than 5.5 or an organic content more than 4.0 % may be rejected.

GLOSSARY

Atterburg Limits – Four states of soil consistency as defined by the liquid limit, plastic limit and shrinkage limit tests.

Capillary Action (Capillarity) – The rise or movement of water in the interstices of a soil due to capillary forces

Capillary Water – Water subject to the influence of capillary action

Cohesion – All of the shear strength of a soil not due to friction; the capacity of sticking or adhering together

Consolidation – The gradual reduction in volume of a soil mass resulting from an increase in compressive stress

Elasticity – Ability of a soil to return to its original shape after having been deformed by a load for a short period of time

Equigranular – A soil that is made up of predominately one grain size

Friable – Easily crumbled, as would be the case with rock that is poorly cemented

Liquid Limit – The water content, as determined by the standard liquid limit test, at which a soil passes from a plastic to a liquid state.

Optimum Moisture Content – The moisture content at which a soil can be compacted to its maximum dry density with a given compactive effort.

Plasticity – The property of a soil that allows it to be deformed beyond the point of recovery without cracking or appreciable volume change.

Plastic Index – The numerical difference between the liquid limit and the plastic limit.

Plastic Limit – The lowest water content, as determined by the standard plastic limit test, at which a soil remains plastic.

Shrinkage and Swell – Volume change due to build-up and release of capillary tensile stresses within the soil's pore water.

Soil – Any earthen material, excluding bed rock, composed of loosely bound mineral grains of various sized and shapes, organic material, water, and gases.

Soil Binder – The finer sized particles in a soil that serve the purpose of holding the soil together.

Soil Horizon – One of the layers of the soil profile, distinguished principally by its various layers, as developed by deposition or weathering or both.

Soil Profile – Vertical section of a soil, showing the nature and sequence of the various layers, as developed by deposition or weathering or both.

Soil Texture (Grain Size Distribution or Gradation) – Proportion of a material of each grain size present in a given soil.

Water Content (Moisture Content) – The ratio, expressed as a percentage, of the weight of water in a given soil mass to the weight of solid particles

SECTION 235 EMBANKMENTS

COORDINATION WITH SEEDING OPERATIONS

Article 107-13 of the Standard Specifications, “Control of Erosion, Siltation, and Pollution”, states, “the Contractor shall take whatever measures are necessary to minimize soil erosion and siltation, water pollution, and air pollution caused by his operations.” The most critical elements are the management of earthwork and grading operations. All Sections, within the Specifications, related to these elements reference the requirements for a contractor to conduct operations such that cut and fill slopes are completely graded to final slope in a continuous manner, specifically Articles 225-2, 226-2, and 230-2. This requirement to finish slopes in a continuous manner facilitates the establishment of permanent vegetation and reduces the quantity and cost associated with maintenance of erosion control measures, including temporary seeding. The finishing of slopes also progresses the project in that areas are not regraded multiple times. With the above requirements in place, Article 107-13 states, “The Engineer **will** limit the area over which clearing and grubbing, excavation, borrow, and embankment operations are performed whenever the Contractor’s operations do not make effective use of construction practices and temporary measures which will minimize erosion, or whenever permanent erosion control features are not being completed as soon as permitted by construction operations.” Many ICAs and NOVs have been issued because the contractor had not used proper earthwork management practices and disturbed a substantial amount of the project without finishing areas in a continuous operation. This ineffective method of grading has cost the Department in additional silt excavation, temporary seeding and mulching and most importantly in the relationship established with the regulatory agencies. Therefore, as required in Article 107-13, the Engineer should take action to ensure the contractor is managing their grading operations to minimize soil erosion, and if not providing proper management, limit such grading activities to complete areas in a continuous manner.

235-2 MATERIALS

As outlined in Article 225-3 of this Manual, it is the responsibility of the Engineer to determine those materials developed from unclassified excavation that are suitable for use in embankment construction. Sod and organic material can be beneficial when used for a seedbed on slopes and shoulders however. If a material is questionable, an investigation by the Geotechnical Unit and/or sampling and testing of the material may be necessary. Frequent visual inspection during placement on the roadway is necessary to avoid inclusion of undesirable pockets of unsuitable material and debris. By observing the action of the material under the wheels of the loaded haul equipment, the Technician can determine the probable location of these undesirable materials. Any pumping, rutting, etc. action should be investigated.

The decision as to the suitability of material should be made as expeditiously as possible by project personnel. However, in the event assistance is necessary, it may be secured through the Division Construction Engineer or Roadway Construction Engineer.

235-3 CONSTRUCTION METHODS

(A) PREPARATION OF EMBANKMENT

Undercutting concurrently with embankment construction is permissible, but should be closely monitored to ensure unsuitable materials are removed and quantities measured. In preparation for embankment, construction of all areas where the depth of embankment is 6 feet or less, consideration should be given to undercutting to a depth which will remove **organics and root mat**. Grade points should be undercut as outlined in Section 225 of this Manual.

Decisions regarding the necessity for undercut should be made sufficiently in advance to prevent delays to the Contractor's operations.

(B) EMBANKMENT FORMATION

The Engineer and/or Technician should work closely with the Contractor to ensure that the hauling is distributed over the full width of the embankment and that the fill is shaped to drain at all times. Each layer placed should be stable without "pumping" or rutting before a subsequent layer is placed.

When it is necessary to "floor in" an embankment area in order to be able to haul across an unstable foundation, the depth of the initial lift of material may be 2 to 3 feet. It should not exceed 3 feet without specific approval of the Division Construction Engineer and the Geotechnical Regional Operations Engineer.

When backfilling in a swamp area or in water, end dumping over the fill face should not be allowed. The material should be dumped on top of the previously constructed fill and pushed forward and somewhat downward in a manner that will keep the surge of liquid material in front of the fill material. If the liquid material builds up sufficiently, to keep it from moving in front of the embankment material, it shall be removed.

Do not place rock or broken pavement greater than 2 inches in diameter within 12 inches of the subgrade or finished grade, whichever is lower. Do not place rock or broken pavement in areas where piles or drilled shafts, including signal pole foundations, will be located. Fill all voids when placing rock or broken pavement lifts.

(C) EMBANKMENT COMPACTION

Embankment compaction is directly related to the type of soil, the proper control of moisture in the soil, the depth of soil layer being compacted, and the equipment and methods used in the work. The Specifications do not include equipment requirements or specific methods relative to the compaction of embankments but do include end result requirements which must be met in order to have an embankment which is considered acceptable. The requirements are:

1. **The embankment must be uniformly constructed with all layers uniformly bound to all preceding layers.** In order to meet this requirement, placement and spreading of the embankment material must be carried out in uniform manner with compaction applied uniformly over the surface as the layers are placed. It is also important for the slopes to be compacted to prevent slides and erosion of material. Slopes constructed principally of soil should be walked with a dozer perpendicular to the alignment to facilitate vegetation.
2. **The embankment material shall be compacted to a density equal to at least 95% of modified AASHTO T99.** The amount of work required to meet this density requirement is

directly related to the type of soil and the proper control of moisture in the soil during compaction. The Density Technician should work closely with the Contractor's supervisory personnel in determining the moisture content of the soil at which density can be obtained. Optimum moisture as determined by moisture density curves is, of course, the ideal, but the range above or below optimum moisture in which the required density can be obtained with a reasonable effort is extremely variable. Failing density tests should immediately be called to the Contractor's attention with notice that corrective action is required. The Technician is not to direct any action or methods, but when the failure to obtain density is obviously a result of the soil being either too wet or too dry, the Technician should call this to the Contractor's attention. Placement of additional embankment material should be suspended unless action is taken to bring the soil within a reasonable range of moisture before compaction. Acceptable corrective action may consist of the addition of moisture when the soil is too dry, drying the soil by scarifying or plowing when the soil is too wet, or the utilization of soil from a different location which will assist in the correction of moisture content in the layers. The Density Technician should not feel compelled to run multiple tests when the Contractor's efforts to achieve density are lacking. Consultation with the Engineer is required when the Contractor appears to be requesting retests at an abnormal level.

3. **The embankment must be uniformly compacted and stable.** In order for the embankment to be uniformly compacted, effort must be applied in an uniform manner over the entire surface of the embankment layers as they are placed. The most difficult time to meet this requirement is when both haul distance and embankment area are short. Under this condition, the Density Technician should make every reasonable effort to verify that compaction is reasonably uniform and each layer must obtain acceptable compaction before the next layer is placed and immediately require that corrective action be taken when density fails to meet requirements.

Instability can occur in some soils even though density requirements are met. Stability of all embankment layers is essential prior to placement of the succeeding layer. Excessive rutting beneath hauling equipment is an indication of instability and should be called to the attention of the Contractor along with instruction that corrective action must be taken. Again, the Technician is not to direct or instruct the Contractor in the methods to be used in correcting this condition.

4. **Comparative embankment density tests shall be performed by an Independent Assurance Technician from the Materials & Tests Unit on federally funded projects.** (See the Minimum Sampling Guide for further information.)

(D) MAINTENANCE

This Article directs specific attention to the Contractor's responsibility in maintaining the work. Articles 104-10 and 105-16 of the Specifications also cover requirements for maintenance and the performance of erosion control work including sanctions, which **may** be imposed if the Contractor fails to comply with these requirements.

Maintenance of embankments, both during the work and after completion, should include shaping, temporary ditches, constructing earth berms along the outer edges of the embankment, and other features which will minimize erosion by surface run-off. Such temporary features are required of the Contractor as a part of maintenance of the work and are not to be paid for separately.

It should also be noted that this article provides for payment for material required to repair embankments damaged by natural causes when such embankments have been properly

constructed, drained, and maintained. Carelessness or neglect on the part of the Contractor may be grounds for directing the Contractor to furnish this material at no cost to the Department. Before this sanction can be imposed, the Engineer must notify the Contractor in writing that conditions exist which, if not given attention, will result in repairs by the Contractor at no cost to the Department.

235-4 TOLERANCE

A tolerance of +/- 0.1 feet from the established grade applies only to those projects or portions of projects which do not include base and pavement. The completed grade shall be checked by the Technician and recorded in a grade book.

TECHNICIAN'S CHECKLIST
SECTION 235
EMBANKMENTS

- 1) Study Specifications, permit drawings, permit conditions, plans, and Special Provisions.
- 2) Has clearing and grubbing been satisfactorily completed and has drainage been installed?
- 3) Has surface vegetation been removed or plowed according to Specifications?
- 4) Is benching necessary?
- 5) Have grade points been undercut and have measurements of the undercut been made?
- 6) Has existing pavement been removed or broken up as required?
- 7) Has the Contractor adhered to the provisions of Subarticle 235-3(B)?
- 8) Check slopes as the embankment is constructed.
- 9) Ensure that density tests are run in compliance with Materials & Tests Unit requirements.
- 10) Is embankment material satisfactory? Is embankment **stable**? Is embankment monitoring required?
- 11) Is embankment being shaped, properly drained, and uniformly compacted, and graded within the tolerances of Article 235-4, if applicable?
- 12) Is the Contractor complying with erosion control and maintenance requirements of Specifications?
- 13) Ensure rock lifts stopped 2 feet below grade.
- 14) See that no rock larger than 2-inch is in the top 12 inches of the subgrade or finished grade whichever is lower.
- 15) Are all voids in rock or broken pavement lifts filled with fine material?
- 16) If repairs to embankments are necessary, are they due to the Contractor's negligence? If so, advise the Engineer who will determine if payment should be made for the repairs. If repairs are the result of natural causes, then compensation should be made at the cost for the excavated material required to repair the damaged embankment.

SECTION 240 DITCH EXCAVATION

240-1 DESCRIPTION

A thorough knowledge of all environmental permits is necessary prior to staking ditches and installing stone.

Unless otherwise classified on the plans, parallel or lateral ditches constructed as an integral part of the graded roadbed, having a continuous slope from the outer limit of the shoulder to the bottom of the ditch, will be considered to be within the roadway grading limits and will be part of the work covered by Section 225, "Unclassified Excavation".

240-2 GENERAL

Ditches should be excavated early during construction operations so that proper drainage is provided at all times during the construction of the project. When the plans require positive drainage prior to undercut and/or subdrains, and the ditch is located in an ESA, it is acceptable to construct the ditch and establish ground cover without pursuing additional continuous grading in that EAS.

The Contractor should understand the information of the survey stakes prior to construction.

240-3 DISPOSAL OF MATERIALS

Materials which are not used in roadway construction should be disposed of in accordance with Section 802.

240-4 MEASUREMENT AND PAYMENT

Excavation beyond the staked limits shall be excluded from these measurements in accordance with Article 105-12 of the Specifications.

When placing rip rap in ditches, the top of the stone should be keyed into the ditch such that it is flush with the side slopes. **The additional excavation necessary for the placement of rip rap in drainage ditches is considered incidental to the pay item of Rip Rap (See Article 876-3) and not compensated under this item.**

TECHNICIAN'S CHECKLIST
SECTION 240
DITCH EXCAVATION

- 1) Study the Specifications, permit drawings, plans, and Special Provisions.
- 2) Does the Contractor understand each type of ditch and the method of staking?
- 3) Are ditches being cut sufficiently deep to permit the installation of rip rap (if shown in the plans), so that the rip rap is not placed on top of the ditch but is placed below the flow line elevation?
- 4) Is the Contractor utilizing equipment that results in over excavation? If so, see that the amount is recorded for deduction from pay quantities.
- 5) Are ditches being constructed sufficiently early to prevent improper project drainage? If not, discuss it with the Contractor and advise the Engineer.
- 6) Ensure adequate erosion control measures installed.
- 7) Do not spread ditch spoil adjacent to the ditch.

SECTION 250 REMOVAL OF EXISTING PAVEMENT

250-1 DESCRIPTION

This section of the Specifications provides for the removal and disposal of all pavement, both existing and temporary, within limits as shown on the plans, or as may be directed by the Engineer. Any pavement removed within the project limits will be compensated under this Section, excluding driveways and pavement removed for the purpose of excavation for a pipe line.

250-2 PAVEMENT REMOVAL AND DISPOSAL

Pavements removed under this section will normally be disposed of either in embankments or in waste areas provided by the Contractor. When concrete pavements are to be removed, the Engineer should check with the District Engineer to see if it is desirable to stockpile any of the material for maintenance purposes. If broken pavement is to be salvaged for this reason, the Contractor may be required to stockpile the material in adjacent areas on the right of way but **may not** be required to load and haul the material for State maintenance use.

Where there is more than one foot of fill between the existing pavement elevation and the low side of the proposed subgrade elevation, the pavement should be broken up and left in place. If the Contractor elects to salvage the pavement in lieu of breaking and including such pavement in the embankment, the Contractor must replace this material with an equal volume of earth material. The replacement of this material is not to be paid for.

The provisions of Section 802 of the Specifications shall be strictly adhered to when broken pavement is disposed of in waste areas furnished by the Contractor.

250-3 MEASUREMENT AND PAYMENT

Measurement in square yards for pavement removed will be made of the actual surface prior to removal. The depth of pavement should also be noted in the remarks column of the pay record book. Measurement in square yards of pavement broken and left in place will be made of the actual surface area prior to breaking.

The volume of pavement removed must be deducted from quantities of excavation for which the Contractor is to be paid **when it was included in the original earthwork cross sections**. Pavement depth must be noted at the time of removal such that sufficient information is available to make the calculation. Payment will be made by area for the work measured in accordance with Subarticle 250-3. Attention is directed to this Subarticle of the Specifications for payment when a combination of layers exists.

Pavement removed for the purpose of pipe installation is a part of the work of pipe installation and payment is to be made in accordance with Article 300-9.

Pavement removed from driveways, parking lots, etc. is considered part of unclassified excavation and payment is provided under Article 225.

TECHNICIAN'S CHECK LIST
SECTION 250
REMOVAL OF EXISTING PAVEMENT

- 1) Study Specifications, plans, and Special Provisions.
- 2) Check with the Engineer to see if any broken concrete pavement is to be salvaged for use by the Department or if permission has been given for the Contractor to salvage or recycle it.
- 3) Ensure areas to be **removed** have been measured and marked.
- 4) Are all areas where piles are to be driven marked for removal? No pavement should be wasted within the embankments where piles are proposed.
- 5) Ensure areas to be **broken up** have been measured and marked.
- 6) Record depth of pavement during removal, including any variations.
- 7) Wasting of pavement shall be performed in accordance with Article 802.
- 8) Pipe removal for pipe installation is part of Article 300.
- 9) Miscellaneous pavement removal, driveways, parking lots is part of Article 225.

SECTION 260 PROOF ROLLING

260-1 DESCRIPTION

The Contractor may operate the proof roller at times other than when directed by the Technician. Such use is at the Contractor's election and is not to be considered as work performed under this section.

The requirement for proof rolling, when required by the contract, **may not** be eliminated or modified without written approval.

260-2 EQUIPMENT

The Engineer and Technician shall check to see that the equipment conforms to the requirements of this article, observe ballast loading, and check tire pressure each time the equipment is used. In order not to trap water, thereby increasing the weight, the roller should be covered with suitable material to prevent intrusion of water.

Weight tickets signed by a licensed public weighmaster may be used to determine the empty weight of the roller and the weight of bulk ballast to be used.

Requests by the Contractor to substitute other types of equipment shall be forwarded to the State Construction Engineer through the Division Engineer for approval or disapproval.

The Contractor **shall not** be permitted to tow the loaded proof roller over existing structures or pavement. Refer to Article 105-15 of the Specifications and this Manual.

260-3 CONSTRUCTION METHODS

Proof rolling is to be done when the roadbed is within plus or minus 6 inches of finished grade and the roadbed shall be rolled for a width located between points 2 feet outside the proposed edges of pavement including shoulder pavement. Care should be taken when operating over drainage that is within 6 feet of subgrade. The Contractor should construct ramps to prevent crushing top drainage pipes. If damage is suspected, the Materials and Tests Unit can perform a camera investigation.

A coverage is considered to be that stage in the rolling procedure when the entire area to be proof rolled has been covered by the body of the proof roller. Complete coverage will not include the area between the pneumatic tires... Each additional pass should overlap the previous pass by a minimum of 1 tire width.

Areas which have failed and been repaired shall be proof rolled again to confirm stability.

The Technician shall follow the proof roller observing the action of the roadbed produced immediately behind the tires of the roller. When the roadbed material compresses and remains compressed, the roadbed is satisfactory. When the roadbed material compresses and then rebounds to any **appreciable** extent, further testing and investigation and consultation with the Engineer and/or the Geotechnical Unit shall be made. Horizontal slippage or crust breakage is not considered as failure.

The Engineer and Technician shall take **immediate** steps to determine the cause of any failures observed. Failures are typically caused by unsuitable materials or excessively wet materials. These conditions may be found to be as much as 6 feet below the roadbed surface. Assistance in determining corrective action required may be obtained from the Geotechnical Unit.

Should it be determined that the failure is due to negligence or is not compensable under the Specifications, the Engineer shall so inform the Contractor in writing.

260-4 MEASUREMENT AND PAYMENT

No measurement of rolling time is to be made when:

- 1) The roller is being used for the Contractor's convenience.
- 2) The Technician is not present.
- 3) Rolling is necessary due to corrective action made necessary by the negligence of the Contractor or damage from weather.

TECHNICIAN'S CHECKLIST SECTION 260 PROOF ROLLING

- 1) Study Specifications, plans, and the Special Provisions.
- 2) Check to see that equipment conforms to Specifications.
- 3) Observe for correct loading and check tire pressure before each use and record in diary.
- 4) **Do not** permit Contractor to tow loaded roller over structures or pavements in use or designated to be retained for use.
- 5) Ramp over pipe and subsurface drainage that is less than six feet. deep.
- 6) See that roller is protected against trapped water creating overload.
- 7) Record proof rolling time on M & T form.
- 8) Report failures to Engineer and assist in determination of cause.
- 9) When failures occur, keep a complete and detailed record of Contractor's personnel, equipment, and operations required for correction.
- 10) Determine cause for failure prior to determining responsibility for compensation of the repair. Typically, compensation is not provided for correcting failures in fill sections unless deep failures occur below the fill depth.
- 11) Do not allow a lengthy duration to occur between proof rolling and placement of pavement structure.

SECTION 265 SELECT GRANULAR MATERIAL

265-1 DESCRIPTION

Furnish and place select granular material as detailed in the plans or as directed.

265-2 MATERIALS

See Section 1016 for material information. Some borrow pits will provide material meeting select granular material requirements. The Contractor may use the same material for embankment formation that is used for Select Granular (when meeting the requirements of 1016-3 for Class II and Class III).

When overruns are anticipated for this item, consult the Geotechnical Unit for guidance on possible alternatives.

265-3 CONSTRUCTION METHODS

Care should be taken placing the material when fabric is used. Place select material over fabric or in water by dumping and surging forward with a dozer or other suitable equipment. Do not dump over the edge of the previously constructed embankment. Use only Class III Select Granular Material in water. This article DOES NOT require the use of Select Granular Material every time geotextile for soil stabilization is utilized.

265-4 MEASUREMENT AND PAYMENT

Select Granular Material is paid for as Select Granular Material unless the contract includes the item of Borrow Excavation and the Select Granular Material is being obtained from the same pit. When this occurs, Select Granular Material is paid for at the lower price for either Select Granular Material or Borrow Material.

When Select Granular Material is required to backfill undercut performed as a part of Comprehensive Grading, payment for the material utilized to backfill the undercut will be made as described in this article.

The preferred method of measurement for Select Granular Material is the in place volume or weight. Truck measurement is allowed at the Engineer's discretion.

TECHNICIAN'S CHECKLIST SECTION 260 SELECT GRANULAR MATERIAL

- 1) Is the proper Class of Select Granular Material being utilized?
- 2) Is the Select Granular Material originating from the project borrow pit and if so, is the lesser unit price of Select Granular Material or Borrow being used?
- 3) Are the quantities "used to date" being monitored for overruns?
- 4) Select Granular Material used to backfill pipe is incidental to the item of pipe. If the Select Granular Material is hauled from the project borrow pit, no deduction will be made for the portion hauled that is utilized to backfill pipe.

**SECTION 270
GEOTEXTILE FOR SOIL STABILIZATION**

270-1 DESCRIPTION

Furnish and install geotextile in accordance with the plans or as directed. Work includes furnishing, hauling, placing, sewing and stapling geotextile..

270-2 MATERIALS

Refer to Section 1056. **Do not use geotextile that has been exposed to sunlight for more than 7 days.**

270-3 CONSTRUCTION METHODS

Place geotextile, overlap, and backfill where directed and as outlined in the specification.

270-4 MEASUREMENT AND PAYMENT

Measure the square yards along the surface of the ground. No measurement is made of overlaps.

**TECHNICIAN'S CHECKLIST
SECTION 270
GEOTEXTILE FOR SOIL STABILIZATION**

- 1) Have the plans and special details been reviewed to ensure that geotextile will be placed as detailed?
- 2) Has the geotextile been received and is it in accordance with the plan details and specifications?
- 3) Is the geotextile being sewed where required or overlapped a minimum of 18”?

**SECTION 265
ROCK PLATING**

275-1 DESCRIPTION

Furnish and place rock plating as detailed in the plans or as directed.

275-2 MATERIALS

Provide Type 2 geotextiles and utilize the type of rip rap shown in the plan details.

275-3 CONSTRUCTION METHODS

Construct embankments and compact fill slopes. Undercut where necessary to rock plate cut slopes or to embed rock plating below the ground line. Unroll geotextile fabric down the slope, perpendicular to the roadway centerline. If a roll of geotextile does not reach the bottom the area, lap the subsequent roll 5 ft. with upper roll lapped over the lower roll. Adjacent rolls should be lapped 18”.

Install subsurface drainage when shown on the plans.

The rip rap should be uniformly graded, even if hand distribution is required to achieve uniformity.

275-4 MEASUREMENT AND PAYMENT

Measurement for Rock Plating is made along the slope face and paid for by the square yard. No measurement is made for rock plating embedded below the ground line.

Payment for Rock Plating includes the geotextile and any undercut necessary to properly install the Rock Plating. If subsurface drainage is required, payment is made in accordance with Section 815.

TECHNICIAN’S CHECKLIST SECTION 275 ROCK PLATING

- 1) Is rock plating being installed at the proper time of construction to protect the slopes?
- 2) Is the detailed type of Rip Rap being utilized?
- 3) Is Type 2 geotextile being used?
- 4) Has the geotextile been unrolled perpendicular to the centerline of the roadway?
- 5) Has the geotextile been overlapped 5 ft. for rolls that do not reach the bottom of the area and is the top roll overlapped over the lower roll?
- 6) Are adjacent rolls of geotextile overlapped 18”?
- 7) Is subsurface drainage required?
- 8) If ABC is required, has it been compacted?